INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE TWELFTH MEETING OF THE ASIA/PACIFIC AIR TRAFFIC FLOW MANAGEMENT STEERING GROUP (ATFM/SG/12)

Video Teleconference, 13 – 16 September 2022

The views expressed in this Report should be taken as those of the Meeting and not the Organization

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

CONTENTS

……

APPENDIXES

……

INTRODUCTION

Meeting

1.1 The Twelfth Meeting of Air Traffic Flow Management Steering Group (ATFM/SG/12) was held by Video Teleconference (VTC) from 13 to 16 September 2022.

1.2 The ATFM/A-CDM Integration Webinar was held by Video Teleconference (VTC) on 12 September 2022.

Attendance

2.1 The ATFM/SG/12 VTC was attended by 224 registered participants from 24 Administrations, and four International Organizations including Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States, Viet Nam, CANSO, IATA, IFALPA, IFATCA, and ICAO. A list of registered participants is at **Appendix A** to this report.

2.2 The ATFM/A-CDM webinar was attended by 220 registered participants from 24 Administrations, and four International Organizations including Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States, Viet Nam, CANSO, IATA, IFALPA, IFATCA, and ICAO. A list of registered ATFM/SG/12 participants is also provided at **Appendix A** to this report.

Officers and Regional Office

3.1 Mr. Piyawut Tantimekabut, Air Traffic Management Network Manager, AEROTHAI, Thailand, chaired the ATFM/SG/12 meeting.

3.2 Mr. Hiroyuki Takata, Regional Officer Air Traffic Management (ATM), ICAO Asia and Pacific Regional Office, was Secretary for the ATFM/SG/12 meeting. He was assisted by Mr. Manjunath Krishna Nelli, Regional Officer ATM, Mr. Shane Sumner, Regional Officer ATM/AIM, Mr. Ying Weng Kit, ATM Officer and Ms. Prakayphet Chalayonnawin, Programme Analysis Associate (ATM), ICAO Asia and Pacific Regional Office.

Opening of the Meeting

4.1 On behalf of Mr. Tao Ma, Regional Director of the ICAO Asia and Pacific Regions, Mr. Hiroyuki Takata welcomed all the participants to the meeting.

4.2 Mr. Piyawut Tantimekabut welcomed participants to the meeting.

Documentation and Working Language

5.1 The working language of the meeting and all documentation was English. There were 20 working papers, two information papers, and seven presentations considered by the meeting. A list of papers is included at **Appendix B** to this report.

Draft Conclusions, Conclusions, Draft Decisions and Decisions of ATFM/SG – Definition

6.1 ATFM/SG records its actions in the form of Draft Conclusions, Draft Decisions and Decisions within the following definitions:

Draft Conclusions deal with matters that, according to APANPIRG terms of reference, require the attention of States, or action by the ICAO in accordance with established procedures;

Conclusions deal with matters of a technical nature relating to regional guidance material for publication on the ICAO Asia/Pacific Regional Office website;

Draft Decisions deal with the matters of concern only to APANPIRG and its contributory bodies; and

Decisions of ATFM/SG that relate solely to matters dealing with the internal working arrangements of ATFM/SG.

List of Conclusions, Draft Conclusions, Decisions and Draft Decisions

7.1 List of Conclusions

Nil.

7.2 List of Draft Conclusions

<table>
<tr><td colspan="3">Draft Conclusion ATFM/SG/12-1: Update Regional Framework for Collaborative ATFM</td></tr>
<tr><td colspan="2">What: That, the Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0. provided in Appendix C to the Report be adopted, and made available on the ICAO Asia/Pacific Regional Office web site, replacing Version 3.0.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why:
To amend the Regional Framework document and performance expectations, taking into account updates in APAC Seamless ANS Plan and GANP and related ASBU modules;</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: On adoption by ATM/SG/10 21-Oct-22</td><td colspan="2">Status: Draft to be adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
</table>

Draft Conclusion ATFM/SG/12-2: ATFM Training Guide	
What: That, 1. the ATFM Training Guide provided in **ATFM/SG/12 WP/15 Attachment B** be made available on the ICAO Asia/Pacific Regional Office website; and 2. Asia/Pacific Administrations are urged to refer to the ATFM Training Guidance material for developing their training programs.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide guidance on ATFM Training and regional best practices. The Training Guide, previously an appendix to the Regional Framework for Collaborative ATFM, to now be maintained as a stand-alone regional guidance document	Follow-up: ☒Required from States
When: On adoption by ATM/SG/10 21-Oct-22	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX	

Draft Conclusion ATFM/SG/12-3: Regional ATFM Implementation Status Reporting	
What: That, subject to final offline review by ATFM/SG: 1. the ATFM Implementation Status Report form (version 3.0) provided in **ATFM/SG/12 WP/16 Attachment A** be adopted, and made available on the ICAO Asia/Pacific Regional Office website; 2. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 28th February each year, using the ATFM Implementation Status Report Form; and 3. The Regional Framework for Collaborative ATFM be amended to include the information in ATFM/SG/12 WP/14 Attachment A. *Note: This Conclusion supersedes Conclusion ATM/SG/5-3*	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To facilitate the monitoring of Regional ATFM implementation status, and the identification of priority areas of ATFM for inclusion in Seamless ANS monitoring and for the attention of APANPIRG.	Follow-up: ☒Required from States
When: On adoption by ATM/SG/10 21-Oct-22	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX	

7.3 List of Decisions and Draft Decisions

Nil

……

REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP/1) was adopted by the meeting.

1.2 The meeting was informed that the revised agenda including a specific item for Airport Collaborative Decision-Making (A-CDM) matters would be prepared by the Chair and the secretariat, and proposed at the ATFM/SG/13.

Agenda Item 2: Review Outcomes of Related Meetings

Related Meetings Outcomes (WP/2)

2.1 ICAO provided information on the outcomes relevant to ATFM/SG from related Asia/Pacific Regional meetings:

- The Ninth Meeting of the Air Traffic Management Sub-Group (ATM/SG/9, 01 to 05 November 2021);
- The Thirty-Second Meeting of APANPIRG (APANPIRG/32, 01 to 03 December 2021);
- The Sixth Meeting of the Asia/Pacific SWIM Task Force (SWIM TF/6, 17 to 20 May 2022);
- The MET/ATM Webinar and Eleventh Meeting of the Meteorological Requirements Working Group (MET R/WG/11, 30 May to 3 June 2022); and
- The Twenty-Sixth Meeting of the Communications, Navigation and Surveillance Sub-Group (CNS SG/26, 5 to 9 September 2022).

2.2 The meeting was informed of the following A-CDM/ATFM-related Conclusions/Decisions were adopted:

- ***Conclusion APANPIRG/32-3: Implementation of Efficient ATS Horizontal Separations and Transfer of Control Aircraft Spacing***
- ***Decision APANPIRG/32-4: Revised ATFM/SG Terms of Reference***
- ***Decision APANPIRG/32/1 (AOP/SG/5-4): Dissolution of the APA-CDM/TF***
- ***Conclusion AOP/SG/5-1: A-CDM Frequently Asked Questions (FAQs)***
- ***Conclusion AOP/SG/5-2: Framework for Monitoring the Implementation of A-CDM***
- ***Conclusion AOP/SG/5-3: Amendment to APAC A-CDM Implementation Plan***
- ***Decision MET/R WG/11/01: Update the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations***
- ***Decision MET/R/11/03: Further analysis of ICAO APAC Regional Survey on the provision of MET services to support ATM and ATFM and Follow-up Actions***
- ***Decision MET/R WG/11/05: Meteorological Information for ATFM in the Regional Framework Document for Collaborative ATFM***

- ***Draft Conclusion CNS SG/26/06 (SWIM TF/06/02, SWIM TF/06/04) - The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan***

Review Outcomes from MET/R WG/11 (WP/03)

2.3 The Chair of the MET/R WG presented outcomes from MET/R WG/11 relevant to the ATFM/SG, including outcomes related to the ICAO APAC MET/ATM Webinar 2022 and MET/ATM survey, updates to the MET/ATM regional guidance document, education on the space weather advisory service, and guidance on exchanging special air-reports.

2.4 The meeting was informed that the Twenty-sixth Meeting of the Meteorology Sub-Group (MET/SG/26), held from 1 to 5 August 2022, reviewed the updated *Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations*, as proposed by MET/R WG/11, and approved the updates under ***Decision MET SG/26/02*** – *Update the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations*.

2.5 The meeting was informed that ICAO planned to organise an APAC Webinar on the Space Weather Advisory Information Services in 2022. In addition, MET/R WG/11 proposed to promote and assist ATM stakeholders and Airspace Users with user education on the space weather advisory service, including seeking input from end users on the required content of a workshop or seminar and exercise (on space weather). The meeting acknowledged the importance of the space weather advisory information considering the impact on ATM/ATC operations.

2.6 The Chair of ATFM/SG thanked MET/R WG for their support for ATFM-related regional activities, including updating the Regional Framework for Collaborative ATFM.

Agenda Item 3: ATFM/CDM Global Update

No papers

Agenda Item 4: Review of Current CDM/ATFM Operations and Problem Areas

BOBCAT Operational Updates (WP/4, SP/1)

4.1 The meeting was provided with an operational analysis and overview of westbound flights through the Kabul Flight Information Region (FIR) associated with the Bay of Bengal Cooperative ATFM (BOBCAT) system.

4.2 The meeting was informed that BOBCAT ATFM service had been temporarily suspended but the system had not been shut down. While Bangkok ATFMU did not monitor the system, it was in condition to be when required, with engineering support, per normal procedure.

4.3 Although Bangkok ATFMU reduced its operating hours to 2330 – 1430 UTC instead of the usual H24 following the decision to temporarily suspend the BOBCAT ATFM service, it would be able to reinstate H24 service when it was once again required.

4.4 ICAO informed the meeting that the Kabul FIR airspace was currently classified as Class G with no ATS provision, but contingency arrangements for flights operating in the FIR were in place for many months, and related NOTAMs were published by the Afghanistan authority. However, the majority of airspace users continued to avoid the Kabul FIR.

4.5 Pakistan informed the meeting that they had offered Afghanistan to support ATS resumption, including ATC training, and provided a paper to the ICAO Assembly this year. They also informed the meeting that they had not experienced any difficulty dealing with traffic on Air Traffic Services (ATS) route P500.

4.6 The meeting noted that Thailand would continue to conduct the post operations analysis of the BOBCAT allocations and share feedback with all the stakeholders. India and Pakistan would continue their active coordination to improve the BOBCAT outcomes (entry of flights to the Kabul FIR at their planned flight level) when required.

4.7 In response to a query at the previous ATFM/SG on Slot Allocation Messages (SAMs), Thailand informed the meeting that the BOBCAT system could deliver information using SAMs, Slot Revision Messages (SRMs), and Slot Cancellation Messages (SLCs) for flights that operated from Thailand's airports or transited the Bangkok FIR, i.e. flights whose flight plans were received by Thailand's Flight Data Management Center.

4.8 To enable the BOBCAT system to also construct and distribute SAM, SRM, and SLC for flights that neither originated from airports in Thailand nor transited the Bangkok FIR, considerable adjustments would have to be made to the BOBCAT system and/or the separate ATFM system responsible for generating and distributing the messages to enable them to perform the function.

4.9 Thailand sought inputs from other States/Administrations and stakeholders – particularly airspace users – on the usefulness of having BOBCAT slots be delivered via Aeronautical Fixed Telecommunications Network/Automated Message Handling System (AFTN/AMHS) in addition to the existing web page.

4.10 Hong Kong China mentioned that they needed to check the BOBCAT website for Calculated Take Off Times (CTOTs) and manually put it into their system. Therefore, having BOBCAT deliver information via SAM/SRM/SLC could help reduce the workload.

4.11 IATA informed the meeting that they had not received any requests from member airlines regarding receiving SAM/SRM/SLC.

Progress Update from Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration (WP/5, SP/2)

4.12 The meeting was provided with the progress update of the *Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration* (AMNAC), a collaborative effort to implement cross-border ATFM in the Asia-Pacific region, including post-operations analysis from GDP trials and GDPs activated in response to special and unforeseen events, continued situational information exchange during the COVID-19 pandemic, a proposal to expand the scope of the routine ATFM planning web-conferences, and a call for States/Administrations to ensure local procedures that enable facilitation of compliance with cross-border ATFM measures.

4.13 The network post-operations analysis was a web-based portal updated based on data submitted by ATFM Units from the Level-3 AMNAC members every 3 months. The portal was maintained by Thailand and could be accessed at https://bit.ly/amnac-poa.

4.14 The meeting was informed that AMNAC initiated the regular sharing of the *Asia/Pacific ATM/ATFM Status Update* document, with ATFM Units providing their information on ATM and ATFM status, weather outlook, and pandemic-related regulations or restrictions in a collective document giving a network-wide view of pandemic responses in the region. The updated document was hosted on the regional COVID-19 information sharing webpage at https://www.icao.int/APAC/Pages/COVID-19-BCP.aspx.

4.15 The meeting was informed that the bi-weekly ATFM planning web conference held among AMNAC members had been extended to other States/Administrations outside AMNAC. The group proposed the web conference be opened to all States/Administrations in the APAC. The Point of Contact (POC) of the web conference was provided in SP/2.

4.16 New Zealand commented that capturing the reasons for the huge variance in GDP results in a FAQ, to assist States in reviewing their ATFM implementation as lessons learnt to help raise awareness and challenges faced would contribute to expediting implementation in the APAC Region. Hong Kong China and Singapore supported the comment.

4.17 In response to a query, India mentioned that they would join the AMNAC group in the future after the ATFM system upgrade was completed, but they had not yet fixed the timing.

NARAHG Update (WP/6, SP/4)

4.18 The meeting was provided with an update on progress of the Northeast Asia Regional ATFM Harmonization Group (NARAHG), formed by China, Japan, and Republic of Korea (ROK). Information was provided that NARAHG regular meetings had been temporarily suspended since 2020 since the decline of international traffic due to the COVID-19 pandemic.

4.19 The meeting was informed that China and Japan achieved data connection between ATFM systems via the Asia/Pacific Common AeRonautical Virtual Private Network (CRV). Moreover, the NARAHG ATFM system connectivity, including ROK's system, would be completed in 2023.

4.20 In discussion the meeting noted the precise CTO operational concepts and procedure by NARAHG was still under the discussion within the group. In response to a query, the meeting was informed that Boundary Time Over (BTO[1]) would be used only within NARAHG currently, and it was not intended to exchange BTO with other ATFMU or ATFM systems at this moment.

4.21 The meeting was informed that Japan and ROK were working closely with other States/Administrations by participating in ADP exchanges, monthly GDP operational trials, and bi-weekly ATFM web conferences. In addition, ROK considered joining the AMNAC group to strengthen cross-border ATFM cooperation. Through the corporations with other ATFMUs, Japan and ROK recognized the need to study the combined use of Calculated Time Over (CTO) and CTOT with other States/Administrations for interoperability in the APAC.

ATFM Collaboration among EATMCG Members Using Multi-Nodal ATFM Concept of Operation (WP/7, SP/6)

[1] The BTO concept was not used in ICAO Doc 9971 – *Manual on Collaborative ATFM*, or in the *Asia/Pacific Regional Framework for Collaborative ATFM*.

4.22 The meeting was provided with the progress updates of ATFM Collaboration among EATMCG members using the multi-nodal ATFM concept of operations.

4.23 The meeting was informed that Hong Kong China and ROK had initiated a series of Ground Delay Programme (GDP) operational trials with other EATMCG members on a monthly basis to continuously validate the CONOPS and to develop internal handling procedures, in collaboration with the Asia/Pacific Cross Border Multi nodal ATFM Collaboration (AMNAC) initiative since 2021.

4.24 The meeting was further informed that the group currently utilized email as the primary mean of CTOT distribution/revision, and Hong Kong China had supported the idea of using Slot Allocation Message (SAM) via AFTN with the group members for consideration. The meeting noted that the Regional Framework for Collaborative ATFM specified the use of the Flight Information Exchange Model (FIXM) (where capability existed) or AFTN for distribution of ATFM measures.

4.25 The progress update of the member States, Hong Kong China, Japan, Republic of Korea, and the Philippines, was provided.

4.26 The meeting was grateful for EATMACG's cooperation in using the Regional ATFM Concept of Operations (multi-nodal ATFM concept), especially for acting as a bridge between North East Asia and South East Asia.

Recommended Procedure for GDP Operation Trial (WP/8)

4.27 The meeting was provided with information on the experience of establishing GDP operational trial procedure, and a recommendation for standardizing the procedure of GDP operational trials among States/Administrations in the APAC region.

4.28 The meeting was informed that the EATMCG promoted the GDP operational trial among Republic of Korea, Hong Kong China, Japan, Philippines and Taibei ACC. Based on the findings of the pilot operation the GDP trial procedure was supplemented.

4.29 The recommended procedure by EATMCG included Identifying stakeholders' requirements, selection of States/Administrations to cooperate, preliminary consultation on operation procedures, GDP operational trial, post operations analysis, and official GDP operation.

4.30 The group urged other States/Administrations to participate in the paper trial or operational trial even for one or two flights, to establish better predictability.

4.31 ATFM/IR/SWG was asked to consider inclusion the recommended procedure for GDP operation trial into the Regional Framework in the future.

Progress for ATFM and A-CDM Integration in Japan (WP/9, SP/5)

4.32 The meeting was provided with the efforts of establishment of ATFM and A-CDM, and the current situation of integration ATFM and A-CDM in Japan and the future plan.

4.33 The meeting was informed that the renewal of all of the ATC systems for the airport, enroute, oceanic airspace, and ATFM made the utilization of the existing database with the new architecture possible. Therefore, A-CDM-related information such as Target Off Block Time (TOBT) could become effectively referable by all the other systems.

4.34 Japan commented that implementing ATFM and A-CDM integration would reduce congestion in flight and on the ground. Moreover, it would contribute to CO2 emission reduction.

Missing DEP Messages (WP/10)

4.35 ICAO provided an update on the issue of missing Departure (DEP) messages, as discussed at ATFM/SG/8 (2018), ATFM/SG/9 (2019) and ATFM/SG/10 (2020), and presented to ATM/SG meetings in 2019 and 2021.

4.36 The meeting was reminded of ICAO Doc 4444 *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM) procedures for the addressing of ATS messages, noting that there were multiple examples of APAC Administrations specifying noncompliant Flight Plan (FPL) addressing requirements in Aeronautical Information Publication (AIP) Section ENR 1.11, together with the use in AFTN addresses of three-letter designators that were not registered for their use in Doc 8585 *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*. It was noted that specification of non-compliant addresses was a key factor in missing FPL and associated ATS messages (including DEP messages).

4.37 Analysis of incorrect FPL addressing requirements in AIP would continue, with a view to raising APANPIRG Air Navigation Deficiencies against non-compliance with ICAO Annexes and PANS where necessary.

4.38 The meeting was informed of the APAC Administrations for which APANPIRG ANS Deficiencies were recorded, where the most recent APAC regional analysis indicated 5% or more of the required DEP messages were not received by en-route and/or destination ATS units, as agreed by APANPIRG/31 (December 2020):

Deficiency remained in place: Bangladesh, India, Malaysia, Maldives, Nepal, USA

4.39 The meeting was invited to note that few Administrations achieved 100% of DEP messages transmitted to all relevant participating FIRs. All Administrations should examine their processes and system configuration in order to improve overall performance.

4.40 It was noted that a large percentage of missing DEP messages pertained to flights departing from other ICAO regions (Mid-East/Europe/AFI). The meeting also noted that considerable progress had been made by APAC States in reducing the percentage of DEP messages.

4.41 States were requested to participate in the next regional data gathering exercise.

Analysis of Missing Departure (DEP) Messages (WP/11, SP/3)

4.42 India presented the analysis of missing DEP messages in Indian FIRs.

4.43 Taking note of the ANS deficiency of missing DEP messages from India, action was taken by India to ensure compliance with the provisions for generation and transmission of DEP messages as per the PANS-ATM. A remarkable improvement had been observed during the analysis of the missing DEP messages during the period from November 2021 to June 2022.

4.44 The analysis for missing DEP messages was conducted taking into consideration active FPLs for international flights, segregated from arrivals and departures at aerodromes in India. The analysis showed that, the percentage of missing DEP messages had reduced to below 9% since April 2022, and it also showed that DEP message was not received for more than 34% of international flights landing at Indian airports.

4.45 The meeting appreciated India's efforts in this regard. Singapore informed that they were

willing to support India to obtain more information regarding missing DEP messages for flights departing from Singapore. Thailand reported their willingness to support India in this exercise, which was welcomed by India. The meeting supported the need for a Regional data gathering and analysis exercise.

Regional ATFM Implementation Status (WP/12)

4.46 ICAO provided a summary of the ATFM implementation status of APAC Administrations, reported against the performance objectives of the Regional Framework for Collaborative ATFM. Annual implementation status reports for 2022 were received from 14 APAC Administrations:

Bangladesh, Cambodia, Hong Kong China, India, Indonesia, Japan, Mongolia, Nepal, New Zealand, Pakistan, Republic of Korea, Singapore, Thailand and Viet Nam.

4.47 Based on reports received States were assessed as having *Robust* (90-100%), *Marginal* (70-89%) or *Incomplete* (0-69%) implementation.

4.48 Japan, Singapore, Thailand and USA were assessed as having Robust implementation.

4.49 The following APAC States had never provided an implementation status report:

Afghanistan, Bhutan, Brunei Darussalam, Cook Islands, Fiji, France (French Polynesia), DPR Korea, Kiribati, Lao PDR, Marshall Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Sri Lanka, Timor Leste, Tonga, Tuvalu, Vanuatu.

4.50 Two Administrations submitted their ATFM Implementation Report Form to the ICAO APAC office during the ATFM/SG/12, and the Regional ATFM Implementation Status was updated. (**Table 1**)

Administration (Tier)	**% Implementation**		**Implementation Status**
	2021	**2022**	
Afghanistan (B)	*never reported*	*no report*	Did Not Report
Australia (A)	87	*no report*	Marginal
Bangladesh (B)	13	13	Incomplete
Bhutan (B)	*never reported*	*no report*	Did Not Report
Brunei Darussalam (B)	*never reported*	*no report*	Did Not Report
Cambodia (A)	*no report* (63 in 2020)	82	Marginal
China (A)	*no report* (87 in 2020)	*no report*	Marginal
Hong Kong, China (A)	89	89	Marginal
Macao, China (B)	*no report* (23 in 2020)	*no report*	Incomplete
Cook Islands (B)	*never reported*	*no report*	Did Not Report
Fiji (B)	*never reported*	*no report*	Did Not Report
France (French Polynesia) (B)	*never reported*	*no report*	Did Not Report
DPR Korea (B)	*never reported*	*no report*	Did Not Report
India (A)	92	84	Marginal
Indonesia (A)	71	63	Incomplete
Japan (A)	89	94	Robust

Administration (Tier)	% Implementation		Implementation Status
	2021	2022	
Kiribati (B)	*never reported*	*no report*	Did Not Report
Lao PDR (A)	*never reported*	*no report*	Did Not Report
Malaysia (A)	*no report* (16 in 2020)	*no report*	Incomplete
Maldives (B)	*no report* (20 in 2020)	*no report*	Incomplete
Marshall Islands (B)	*never reported*	*no report*	Did Not Report
Micronesia (B)	*never reported*	*no report*	Did Not Report
Mongolia (A)	*no report* (39 in 2020)	40	Incomplete
Myanmar (B)	*no report* (30 in 2020)	*no report*	Incomplete
Nauru (B)	*never reported*	*no report*	Did Not Report
Nepal (B)	43	40	Incomplete
New Caledonia (B)	*no report* (43 in 2020)	*no* report	Incomplete
New Zealand (A)	*no report* (44 in 2020)	67	Incomplete
Pakistan (B)	11	80	Marginal
Palau (B)	*never reported*	*no report*	Did Not Report
Papua New Guinea (B)	*no report* (21 in 2020)	*no report*	Incomplete
Philippines (A)	61	*no report*	Incomplete
Republic of Korea (A)	82	87	Marginal
Samoa (B)	*never reported*	*no report*	Did Not Report
Singapore (A)	97	97	Robust
Solomon Islands (B)	*never reported*	*no report*	Did Not Report
Sri Lanka (B)	*never reported*	*no report*	Did Not Report
Timor Leste (B)	*never reported*	*no report*	Did Not Report
Tonga (B)	*never reported*	*no report*	Did Not Report
Thailand (A)	90	90	Robust
Tuvalu (B)	*never reported*	*no report*	Did Not Report
United States (A)	94	*no report*	Robust
Vanuatu (B)	*never reported*	*no report*	Did Not Report
Viet Nam (A)	34	34	Incomplete

Table 1: Updated Asia/Pacific Region ATFM Implementation Status

4.51 ICAO informed the meeting that the status would be reflected in the revised *Regional Framework for Collaborative ATFM Chapter 6 – APAC Regional ATFM Implementation – Current Status*. The States that had not yet submitted their 2022 report to ICAO APAC Office were invited to do so before proposing ATM/SG/10 agreement to the revised Regional Framework (**ATM/SG/12 WP/15**).

ATFM in the Contingency Situation (WP/13)

4.52 The meeting was provided with information on ATFM in the context of recent years' contingency situations in the Asia and Pacific Region. The meeting was informed that the paper focused

on ATFM operations and issues excluding NOTAM promulgation-related issues, Civil-Military Coordination-related issues, and Danger Area-related issues.

4.53 The meeting was also informed that a Contingency Coordination Team (CCT) would be established during the emergence of a potential crisis according to ICAO Annex 11 – *Air Traffic Services*, Attachment C. The objective of the CCT formation was to exchange up-to-date information with States directly concerned and States which were potential participants in contingency arrangements.

4.54 ICAO informed the meeting that ICAO APAC Regional Office had been engaged with Afghanistan, and with neighbouring States and airspace users, since 16 August 2021. The Kabul FIR CCT was formed and ongoing coordination of ATM contingency operations had been conducted through frequent online meetings.

4.55 The Kabul FIR airspace was currently classified as Class G with no ATS services, except the Kabul control zone. Contingency arrangements were in place for many months, and related NOTAMs were published by the Afghanistan authority.

4.56 The traffic volume on ATS route P500, where ATC was delegated to Tajikistan and Pakistan, had slightly increased. It was necessary to monitor the situation carefully to determine whether ATFM needed to be considered to ensure demand did not exceed the capacity of the neighbouring airspace.

4.57 ICAO informed the meeting that the ICAO APAC office formed the Taibei FIR CCT and held the first video teleconference at 0700 UTC on 4 August 2022 in response to a number of Danger Areas in Taibei FIR, and partially in the Shanghai and Manila FIRs.

4.58 Since the majority of flights through the Taibei FIR were expected to be diverted through either Manila FIR/Ho Chi Minh FIR or Chinese FIRs, the neighbouring FIRs needed to prepare the contingency arrangement taking traffic congestion and/or bottlenecks into consideration.

4.59 The meeting was invited to recall the principles of ATFM in the Doc 9971 – *Manual of Collaborative ATFM* (Part II. Chapter 1. 1.3), including optimizing available airport and airspace capacity without compromising safety, promoting timely and effective coordination and collaboration with all affected stakeholders, recognizing that airspace is a common resource for all users and ensuring equity and transparency, while taking into account security and defence needs, and enhancing predictability, for ANSPs as well as AUs.

4.60 ICAO urged all Administrations to recognize the objective of the CCT and its importance.

4.61 The Chair commented on the close interlinkage of ATFM and contingency arrangements and informed the meeting that the ICAO Air Traffic Management Operations ATMOPS Panel (ATMOPSP) ATFM Working Group (WG) was working on revising Annex 11, PANS-ATM and Doc 9971 in relation with ATFM.

4.62 The meeting noted that related issues such as NOTAM promulgation and Danger Area should be discussed at the ATM/SG and/or higher level meetings.

Lead time of flight plan filing to enhance demand predictability (WP/14, SP/7)

4.63 The meeting was informed of the importance of operators filing flight plans with sufficient lead time to enhance demand predictability, which in turn minimized the chance of initiating unnecessary ATFM measures and delay.

4.64 Hong Kong China informed the meeting that From January to July 2022, 12 GDP operational trials and one Airspace Flow Programme (AFP) were initiated by Hong Kong China. Approximately 200 flights were subjected to the GDP trials and more than 10% of the flights in the GDP were found to have filed their flight plan less than 3 hours prior to the estimated off-block time (EOBT) against the requirement stipulated in the Hong Kong AIP.

4.65 The meeting noted that cross-border ATFM, being an inclusive process, required the participation of all stakeholders to enhance the equitability and effectiveness of the whole system. And the benefits of effective ATFM relied on the timely sharing of information between all partners to improve efficiency and operational decision making.

4.66 Hong Kong China informed the meeting that unnecessary delay might be imposed to flights with FPL filed less than 1.5 hours prior to EOBT as most of slots would have been assigned and the subject flight may be put to the end of the queue.

4.67 The meeting noted that the proposal from Hong Kong China was based on accurate post-operations analysis and should be considered an excellent analysis example.

4.68 The meeting also noted ***Conclusion APANPIRG/27/11*** (September 2016) in this regard.

Conclusion APANPIRG/27/11: Origination of Flight Plan and ATS

That, taking into account *the Regional Framework for Collaborative ATFM Performance Improvement Plan provisions relating to the submission of FPL and ATS messages, States are urged to publish in AIP the requirement that:*

a) *except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours before EOBT;*

b) *DLA messages should be originated when the departure of an aircraft, for which basic flight plan data (FPL or RPL) has been sent, is delayed by 15 minutes or more after the EOBT contained in the basic flight plan data; and*

c) *CHG and CNL messages are promptly originated in accordance with the provisions of ICAO Doc 4444 Procedures for Air Navigation Services (PANS-ATM) 11.4.2.2.*

4.69 CANSO commented that the issue was not unique to Hong Kong China, or APAC Region but to all parts of the world. The information in the ATFM system should be as up-to-date as possible, and ATFM measures should apply based on the most accurate information.

4.70 IATA maintained that the current flight planning requirement, as per Conclusion APANPIRG/27/11, was adequate and that mandating a three hour deadline would unnecessarily remove the exception of later filing due legitimate operational and technical reasons, and potentially add inefficiencies particularly to long haul flights. IATA confirmed it would communicate expectations for flight planning to any member airlines that are identified by Hong Kong China as repeatedly filing late without apparent legitimate reason.

Benefits of Implementing GDPs over MINIT/MITs (WP/20)

4.71 The meeting was provided with information on the benefits of using Ground Delay Programs (GDPs) as the preferred Air Traffic Flow Management (ATFM) solution for Demand-Capacity Balancing (DCB) as compared to Minutes-In-Trial/Miles-In-Trail (MINIT/MIT). The paper also highlighted the need to provide clarity on the purposes of MINIT/MIT restrictions within the requirements notification.

4.72 The meeting noted that in section 4.5 of Part II of the ICAO Doc 9971 (3rd Ed.), various ATFM measures were defined as techniques to achieve the desired outcome of ATFM. These techniques were *inter alia* GDP, Ground Stop (GSt), MINIT, MIT, Minimum Departure Interval (MDI) and Re-routing. However, the paper cautioned on the use of MINIT and MIT highlighting, the caveat that *'The workload associated with its compliance falls on the air traffic controller because of potential upstream network effects. As such, regular usage of MINIT or MIT may indicate that more appropriate ATFM measure should be used in their places'.*

4.73 The meeting was also informed that the application of MINIT and MIT also offered very little operational predictability to stakeholders and lacked optimization of the available airspace capacity.

4.74 The paper stressed the fact that ATFM measures were intended to be used for the purpose of managing traffic flow to address demand-capacity imbalance rather than as a tool to ensure aircraft separation. As such, tolerance windows for ATFM measures should be provided to account for tactical variations rather than applying the measures with a rigidity of an aircraft separation minimum.

4.75 The meeting noted that GDP was a pre-tactical measure compared to MINIT/MIT and, as such, was more predictable and preferable to Airspace Users. It was also noted that GDP was an excellent measure to reduce CO2 emissions. However, on the use of MINIT/MIT, clarity should be provided on its intended purpose in the notification to airmen. There was also discussion on the compliance window for CTO either converted from MINIT/MIT or applied as part of an AFP. There was general consensus on the need to be flexible with the compliance window (+/- 5'). ICAO would further coordinate with other regions such as the North American, Caribbean and Central American Region (NACC) and European and North Atlantic Region (EUR/NAT) on this issue.

Agenda Item 5: Regional ATFM Framework and Guidance Material

Progress of the ATFM Information Requirement Small Working Group (ATFM/IR/SWG) (WP/15)

5.1 The meeting was provided with the update of the Regional Framework for Collaborative ATFM. It was stressed that amendments to the Framework remain aligned with the APANPIRG-approved Asia/Pacific ATFM Concept of Operations.

5.2 The information provided also highlighted updates of the Regional Framework document for each of the Framework sections 5 – *Background Information*, 6 – *Current Situation*, 7 – *Performance Improvement Plan*, and 8 – *Research and Future Development Possibilities*. Several appendices to the Framework were also reviewed. It was proposed to establish the ATFM Training Guide that was an Appendix to the previous version of the Framework as a separate regional guidance document.

5.3 In response to a query on how the MET community could improve in providing seasonal meteorological conditions, the Chair noted that this should be considered by the ATFM experts in the Ad-Hoc group coordinating with MET/R WG.

5.4 The meeting agreed to the following Draft Conclusions:

Draft Conclusion ATFM/SG/12-1: Update Regional Framework for Collaborative ATFM

That, the Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0. provided in **Appendix C to the report** be adopted, and made available on the ICAO Asia/Pacific Regional Office web site, replacing Version 3.0.

Draft Conclusion ATFM/SG/12-2: ATFM Training Guide

That,

1. the ATFM Training Guide provided in **ATFM/SG/12 WP/15 Attachment B** be made available on the ICAO Asia/Pacific Regional Office website; and

2. Asia/Pacific Administrations are urged to refer to the ATFM Training Guidance material for developing their training programs

Update of Regional ATFM monitoring and reporting form (WP/16)

5.5 ICAO provided information on Update of Regional ATFM Plan Monitoring and Reporting Form.

5.6 The regional ATFM performance objectives specified in the ATFM Framework Section 7 - *Performance Improvement Plan*, complemented and where necessary expanded upon the performance objectives of the Seamless ANS Plan. The Performance Improvement Plan continued with the phased approach of implementation of performance expectations. Version 3.0 of the Framework had proposed Phase IA, IB and II with timelines coinciding with Phase I and II of APAC Seamless ANS Plan.

5.7 Recognizing the substantial performance expectations in Phase III of the Seamless ANS Plan, the different update cycles between the Asia/Pacific Seamless ANS Plan and the Framework, the significant impact due to COVID-19 pandemic, and the potential benefits of more granular progress tracking, Regional ATFM Capability Phase III was proposed to be divided into sub-phases A and B, with expected implementation of 03 November 2022 and November 2025.

5.8 ICAO informed the meeting that a common reporting date of 28 February was being proposed for implementation status reports provided against regional plans including the Regional Framework for Collaborative ATFM, Regional Plan for Collaborative AIM, Regional SAR Plan and Regional ATM Contingency Plan. Many Administrations already bundled their status reports into a single email prior to the earliest reporting date, and a common earlier date at end of February each year would ensure that the reported data was received sufficiently early to facilitate implementation reporting to the relevant technical group while allowing flexibility in the scheduling of technical group meetings.

5.9 The meeting was reminded of ATFM/SG/11 task on whether the *marginal* implementation status should be considered for re-naming, to help to clarify performance when reporting to senior management. It would be further discussed at the ATM/SG/10 taking the provisions of the Asia/Pacific Regional Air Navigation Plan into account.

5.10 Recognizing States' differing levels of readiness in ATFM implementation and their relevance in the cross-border ATFM network regardless of their capability levels, it was also proposed to standardize the reporting format of the forms in terms of percentage(s) of implementation efforts, for example: 10%, 20%, 50%, etc. The percentage(s) would be available as a drop-down option for all relevant items.

5.11 Thailand commented that, without a clear and common guideline, the assessment of implementation percentage for each of the reporting element could vary greatly between States/Administrations and might not be helpful for ICAO and ATFM/SG to meaningfully track the progress and identify gaps. A suggestion was made to develop said clear and common guideline to

ensure uniformity among States/Administrations as they assess their implementation levels.

5.12 New Zealand also suggested that a "Remark" column should be added to the Reporting Form to enable States/Administrations to indicate when a particular reporting element is not applicable to them, as not all States/Administrations necessarily need to implement all elements.

5.13 The meeting agreed to have ATFM/IR/SWG develop a draft guideline to assist States/Administrations in assessing the implementation progress in percentage for each element in the Regional ATFM Plan Monitoring and Reporting form and amend the form to include a Remark column.

5.14 Singapore remarked that some elements in the proposed Reporting Form were expected to be implemented in Phase IIIB (2028) and may not be appropriate to be included in the Form. Thailand suggested that those elements could be included but should not be counted toward State/Administration's overall implementation status until the time for Phase IIIB has come. The meeting agreed to the suggestion.

5.15 The meeting noted that this work to be carried out by the ATFM/IR/SWG would be submitted to the Chair of ATFM/SG and/or ATFM/SG for further review and action before adoption for use by States/Administrations.

5.16 The meeting agreed to the following Draft Conclusion:

Draft Conclusion ATFM/SG/12-3: Regional ATFM Implementation Status Reporting

That, subject to final offline review by ATFM/SG:

1. the ATFM Implementation Status Report form (version 3.0) provided in **ATFM/SG/12 WP/16 Attachment A** be adopted and be made available on the ICAO Asia/Pacific Regional Office website;
2. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 28th February each year, using the ATFM Implementation Status Report Form; and
3. The Regional Framework for Collaborative ATFM be amended to include the information in ATFM/SG/12 WP/14 Attachment A.

Note: This Conclusion supersedes Conclusion ATM/SG/5-3

Update on Information Exchange Model Development to support ATFM Operations, ATFM/A-CDM Integration, and FF-ICE/TBO in Asia/Pacific Region (WP/17)

5.17 The meeting was provided with an update on FIXM version 4.2 Extension development to support ATFM information exchange required for cross-border ATFM operations, ATFM/A-CDM integration, and Flight and Flow – Information for a Collaborative Environment/Trajectory-Based Operations) (FF-ICE/TBO) in the Asia/Pacific Region. The meeting was also provided a list of data attributes included in the FIXM version 4.2 Extension that had been developed and tested, and an update on the possible usage of the FIXM to support the exchange of ADP.

5.18 With the release of FIXM version 4.2 in February 2021, the Asia/Pacific FIXM version 4.1 Extension had been updated to version 4.2. Based on the operational scenarios developed for the Multi-Regional TBO Demonstration Phase 1 and Phase 2A during 2020 and 2022, additional data attributes required supporting A-CDM, traffic synchronization, FF-ICE, and TBO were identified. FIXM version 4.2 Extension was therefore developed to include these data attributes in addition to the

data attributes included in the Asia/Pacific FIXM version 4.1 Extension. (**Table 2**)

Data Attribute	FIXM version 4.2
Originally included in the Asia/Pacific FIXM version 4.1 Extension	
ETO (Estimated Time Over)	Core
ELDT (Estimated Landing Time)	Core
CTOT (Calculated Take-Off Time)	Core
CTO (Calculated Time Over)	Core
CLDT (Calculated Landing Time)	Core
TOBT (Target Off-Block Time)	Extension
TSAT (Target Start-up Approval Time)	Extension
TTOT (Target Take-Off Time)	Extension
AOBT (Actual Off-Block Time)	Extension
ATO (Actual Time Over)	Extension
Trajectory • ATO • Flight level or Altitude • Position (Designator or Latitude/Longitude or Relative point)	Extension
Aircraft Track • Ground speed • Flight level or Altitude • Bearing • Position (Designator or Latitude/Longitude or Relative point) • Time over position (Report time)	Extension
Newly identified	
EIBT (Estimated In-Block Time)	Core
TIBT (Target In-Block Time)	Extension
TTO (Target Time Over)	Extension

Table 2: FIXM version 4.2 Extension Data Attributes

5.19 The meeting was requested to provide additional operational requirements, if any, for the FIXM version 4.2 Extension to support cross-border ATFM and ATFM/A-CDM integration in Asia/Pacific region for consideration by SWIM TF in order to develop an extension in due course if deemed necessary.

5.20 The Chair of ATFM/SG/12 reminded States/Administrations to provide their operational requirements to ATFM/SG by December 2022. These requirements, if any, would then be submitted directly to the Co-Chair of SWIM TF for further action.

5.21 The meeting discussed the proposal for scheduling of ATFM/SG meetings before SWIM/TF meetings in order to adequately capture and agree on the operational requirements of ATFM and A-CDM operational scenarios by the ATFM/SG before submitting to SWIM/TF for technical analysis of the same. ICAO Secretariat would coordinate internally to examine the possibility for next year.

Agenda Item 6: Any Other Business

ATM Points of Contact (WP/18)

6.1 In accordance with usual practice at meetings of ICAO APAC technical groups in the ATM, AIM and Search and Rescue (SAR) fields, including ATFM, A-CDM and CCT, the consolidated ATM Points of Contact List was provided for any update by ATFM/SG participants. Any changes could be provided to the ICAO APAC Regional Office by email.

ATFM/A-CDM Integration Webinar Outcome (IP/2)

6.2 The meeting was informed of the outcomes of the ATFM/A-CDM integration webinar, held by Video Tele-Conference (VTC) on 12 September 2022.

6.3 The webinar intended to share knowledge and experience from States experienced in the implementation of A-CDM and ATFM, and assist States in developing implementation plans and strategies for A-CDM integration with ATFM. The webinar mainly focused on the integration process, needs, challenges and accruing benefits to the aviation community. Presentations covered information such as ANSP's experiences/strategies in integration of ATFM and A-CDM, airspace users' expectations for enhancement of flight predictability and the CDM process, the roles of stakeholders (ANSP, Airspace User, Airports, Regulator, etc.), technical/procedural/operational challenges, benefits and future developments.

6.4 A total of eight presentations were delivered by subject matter experts from ICAO, Hong Kong China, Japan, India, Singapore, ACI, CANSO and IATA.

Agenda Item 7: Review of Task List

Review of ATFM/SG Terms of Reference and Task List (WP/19)

7.1 The ATFM/SG Terms of Reference was provided in **ATFM/SG/12 WP/19 Attachment A** for review by the meeting.

7.2 The ATFM/SG Task List, as reviewed and updated by the meeting, is provided at **Appendix D to the Report**.

Agenda Item 8: Date and Venue of the Next Meeting

8.1 The next meeting of ATFM/SG was tentatively planned to be held in Q2 or Q3 2023. Other related meetings' schedules, such as SWIM-TF, needed to be taken into account to fix the date.

Any Administration considering hosting ATFM/SG/13 or later meetings was invited to contact ICAO.

Agenda Item 9: Closing of the Meeting.

9.1 The Chair thanked all participants for their contributions to the ATFM/SG/12 meeting.

……

ATFM/A-CDM Webinar List of Participants

	STATE/NAME		TITLE/ORGANIZATION
1.	**AUSTRALIA (5)**		
	1.	Mr. Simon Godsmark	Network Operations Manager Airservices Australia **AUSTRALIA**
	2.	Ms. Amber Raman	Manager Meteorological Authority Officer Australia Bureau of Meteorology **AUSTRALIA**
	3.	Mr. Ashwin Naidu	Aviation Customer Lead Australia Bureau of Meteorology **AUSTRALIA**
	4.	Ms. Emma Lybrand	Project Lead Australian Bureau of Meteorology **AUSTRALIA**
	5.	Mr. David Crock	Aviation Meteorologist Australian Bureau of Meteorology **AUSTRALIA**
2.	**BANGLADESH (4)**		
	6.	Mr. Md. Masud Rana	Deputy Director, ATM Division Civil Aviation Authority of Bangladesh **BANGLADESH**

	STATE/NAME		TITLE/ORGANIZATION
	7.	Mr. Mahmud Akhter Hossain	Assistant Director, Air Traffic Management Section, HSIA Civil Aviation Authority of Bangladesh **BANGLADESH**
	8.	Mr. Md. Abdun Noor Khan	Assistant Director Civil Aviation Authority of Bangladesh **BANGLADESH**
	9.	Mr. Kazi Khirul Kabir	Assistant Director Hazrat Shahjalal Int'l Airport, Dhaka Civil Aviation Authority of Bangladesh **BANGLADESH**
3.	**BHUTAN (1)**		
	10.	Mr. Karma Yonten	ATCO/AIS National Air Navigation Services Company (NANSC) **BHUTAN**
4.	**CAMBODIA (4)**		
	11.	Mr. Oun Makara	Chief of Air Traffic Services Air Navigation Standard and Safety Department State Secretariat of Civil Aviation **CAMBODIA**

	STATE/NAME		TITLE/ORGANIZATION
	12.	Mr. Vichcheka Buntong	ATM Supervisor Cambodia Air Traffic Services **CAMBODIA**
	13.	Mr. Khorn Vannak	Air Traffic Management Manager Cambodia Air Traffic Services **CAMBODIA**
	14.	Mr. Ngel Damrong	ATM Officer Cambodia Air Traffic Services **CAMBODIA**
5.	**CHINA (3)**		
	15.	Mr. Fu Yongqiang	Director, Sanya Area Control Office Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
	16.	Mr. Tan Wei	Assistant of ATC Division, Middle South Regional ATMB Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
	17.	Mr. Liu Hong	Senior Engineer Operation Supervisory Center Civil Aviation Administration of China **CHINA**

	STATE/NAME		TITLE/ORGANIZATION
6.	**HONG KONG, CHINA (5)**		
	18.	Mr. Alexander Ben Honig	Chief (Three-Runway System) Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	19.	Mr. Anfernee Poon	Senior Operations Officer (Strategic Planning) Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	20.	Mr. Chin Ting Fok	Air Traffic Control Officer / Project Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	21.	Mr. Wing Yan Au	Air Traffic Control Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	22.	Mr. Alex Lok Man Leung	Conversion and Training Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
7.	**FIJI (3)**		
	23.	Ms. Alisi Namoro	ANSI-ATM/SAR Civil Aviation Authority of Fiji **FIJI**

	STATE/NAME		TITLE/ORGANIZATION
	24.	Mr. Makiti Raratabu	Air Navigation Services Inspector - ATM/MET Civil Aviation Authority of Fiji **FIJI**
	25.	Mr. Ilimeleki Navula	Controller Standards/SAR – ATM Fiji Airports **FIJI**
8.	**INDIA (30)**		
	26.	Mrs. Archana Sunil Jadoo	Assistant Director Directorate General of Civil Aviation India **INDIA**
	27.	Mr. Akash Kumar	Assistant Director (Operations) Directorate General of Civil Aviation India **INDIA**
	28.	Mr. Barun Kumar Sarkar	Executive Director (ATM), Air Traffic Flow Management Airports Authority of India **INDIA**
	29.	Mr. Partha Pratim Banerjee	Joint General Manager Airports Authority of India **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	30.	Mr. Sudhanshu Gupta	Joint General Manager (ATM) Airports Authority of India **INDIA**
	31.	Mr. Anup Kumar	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	32.	Mr. Naresh Kumar Chaudhary	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	33.	Ms. Vineeta Upadhyay	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	34.	Mr. Abhishek Raj	Manager (ATM) Airports Authority of India **INDIA**
	35.	Mr. Ajay Kumar	Assistant Manager (ATM-ATFM) Airports Authority of India **INDIA**
	36.	Mr. S V Manohj	Assistant Manager, Air Traffic Management Airports Authority of India **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	37.	Satya Subramaniam	General Manager-Safety Bengaluru airport **INDIA**
	38.	Vanishree K S	Sr. Executive Bengaluru airport **INDIA**
	39.	Rajendra.T	Assistant Bengaluru airport **INDIA**
	40.	Vidhya N M	Secretary to AVP Bengaluru airport **INDIA**
	41.	Ranjit Kumar Singh	Sr. Manager –AOCC Bengaluru airport **INDIA**
	42.	Harishree S Nading	Executive –AOCC Bengaluru airport **INDIA**
	43.	Vigneshwaran	Executive Bengaluru airport **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	44.	Nagumalli Ramesh	Executive - Av Safety Bengaluru airport **INDIA**
	45.	Mr. R. Karthikeyan	Deputy Manager - S&D Bengaluru airport **INDIA**
	46.	Pushpa Pandey	Head-Airside ops Bengaluru airport **INDIA**
	47.	Shashikant Prasad	Dy. Manager Bengaluru airport **INDIA**
	48.	Beena Jaychandran	Sr.Manager Bengaluru airport **INDIA**
	49.	Manoharan S	Dy. Manager Bengaluru airport **INDIA**
	50.	Ashwin.M	Sr. Executive-AOCC Bengaluru airport **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	51.	Shaji M	Sr.Manager Bengaluru airport **INDIA**
	52.	Gireesan.M	Sr.Manager Bengaluru airport **INDIA**
	53.	Ravikrishnan.A	Sr.Manager Bengaluru airport **INDIA**
	54.	Lokesh.C.P	Dy.Manager Bengaluru airport **INDIA**
	55.	Mr. Sharad Gambhir	Senior Manager Adani Ahmedabad **INDIA**
9.	**INDONESIA (7)**		
	56.	Mr. Rachmat Widiyana	ATFM and CDM Planning Manager AirNav Indonesia **INDONESIA**
	57.	Mr. Dedy Syahputra	Junior Manager ATFM & ATS System AirNav Indonesia **INDONESIA**

	STATE/NAME		TITLE/ORGANIZATION
	58.	Mr. Hari Purwanto	Junior Manager ATFM AirNav Indonesia **INDONESIA**
	59.	Mr. Faisal Riza	Junior Manager ATFM & ATS System AirNav Indonesia **INDONESIA**
	60.	Ms. Zakiah Agus	ATFM Staff AirNav Indonesia **INDONESIA**
	61.	Ms. Putri Diana Tarigan	Aeronautical Meteorology Management Operational Officer Indonesia Meteorology Climatology and Geophysics Agency **INDONESIA**
	62.	Ms. Ire Pratiwi	Aviation Forecaster BKMG Indonesia **INDONESIA**
10.	**JAPAN (15)**		
	63.	Mr. Takayuki Harada	Director, Air Traffic International Office Japan Civil Aviation Bureau (JCAB) **JAPAN**

	STATE/NAME		TITLE/ORGANIZATION
	64.	Mr. Yukio Imada	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	65.	Ms. Miho Itou	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	66.	Mr. Hitoshi Makino	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	67.	Mr. Kentari Suzuki	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	68.	Mr. Akihiro Yamamoto	Chief of Flight Information Second Section Japan Civil Aviation Bureau (JCAB) **JAPAN**
	69.	Mr. Tetsya Nozaki	Assistant Chief Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	70.	Mr. Kenichi Yamakawa	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**

	STATE/NAME		TITLE/ORGANIZATION
	71.	Mr. Kentaro Yamauchi	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	72.	Ms. Nozomi Yagi	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	73.	Mr. Takanori Okamoto	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	74.	Ms. Oikawa Ayako	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	75.	Ms. Satomi Tajima	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	76.	Mr. Yuki Kato	Senior Forecaster Japan Meteorological Agency **JAPAN**
	77.	Ms. Michiko Ikeda	Scientific Officer Japan Meteorological Agency **JAPAN**

		STATE/NAME	TITLE/ORGANIZATION
11.		**LAO PDR (2)**	
	78.	Mr. Thanongdeth Nalisak	Deputy Director of Air Navigation Standards Division Department of Civil Aviation of Lao PDR **LAO PDR**
	79.	Mr. Xayphone Latxavong	ATM and SAR Officer Air Navigation Standards Division Department of Civil Aviation of Lao PDR **LAO PDR**
12.		**MALAYSIA (5)**	
	80.	Mr. Mohd Fitri Bin Ishak	Principal Assistant Director Civil Aviation Authority of Malaysia **MALAYSIA**
	81.	Ms. Nor Kamilia Nordin	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**
	82.	Mr. Thomas Luther Albert Jimoni	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**
	83.	Mr. Sharudin Hashim	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**

	STATE/NAME		TITLE/ORGANIZATION
	84.	Mr. Azlan bin Awang Satariah	Kuching ATCC Air Traffic Controller (aerodrome, area procedural, area radar, approach procedural, approach radar) Civil Aviation Authority of Malaysia **MALAYSIA**
13.	**MONGOLIA (3)**		
	85.	Mr. Batbayar Turbat	Director Air Traffic Flow Management Division, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**
	86.	Mrs. Altanzul Tumur	Head Technology & Survey Section, Air Traffic Flow Management Division, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**
	87.	Mrs. Uyanga Bayarkhuu	Officer Air Navigation Services Department, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**
14.	**MYANMAR (1)**		
	88.	Ms. Ohnmar Tun	Assistant General Manager Department of Civil Aviation of Myanmar **MYANMAR**

		STATE/NAME	TITLE/ORGANIZATION
15.		**NEPAL (11)**	
	89.	Mr. Sanjay Kumar	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	90.	Mr. Sitaram Bhandari	Deputy Director Civil Aviation Authority of Nepal, **NEPAL**
	91.	Mr. Dipak Kumar Bajracharya	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	92.	Mr. Babu Raja Nakarmi	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	93.	Mr. Upaj Dhakal	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	94.	Mr. Dinesh Raj Ghimire	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	95.	Mr. Devendra Prasad Shrestha	Deputy Director Civil Aviation Authority of Nepal **NEPAL**

	STATE/NAME		TITLE/ORGANIZATION
	96.	Ms. Rita Shrestha	Manager Civil Aviation Authority of Nepal **NEPAL**
	97.	Mr. Rabindra Maharjan	ATM Inspector Civil Aviation Authority of Nepal **NEPAL**
	98.	Mr. Mahendra Humagai,	Air Traffic Controller Civil Aviation Authority of Nepal **NEPAL**
	99.	Mr. Shyam Kishor	Director Tribhuvan International Airport Civil Aviation Office **NEPAL**
16.	**NEW ZEALAND (3)**		
	100.	Mr. Edmund Heng	Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand **NEW ZEALAND**
	101.	Mr. Peter Blair	ANS Requirement Team Leader Airways New Zealand **NEW ZEALAND**

	STATE/NAME		TITLE/ORGANIZATION
	102.	Mr. Dan Stevens	Policy and Standards Specialist Airways New Zealand **NEW ZEALAND**
17.	**PAKISTAN (9)**		
	103.	Mr. Khurram Shahzad Akram	Director SQMS Pakistan Civil Aviation Authority - SQMS Directorate **PAKISTAN**
	104.	Mr. M. Sarfaraz Gohar	Senior Joint Director ATS Pakistan Civil Aviation Authority **PAKISTAN**
	105.	Mr. Ali Hassan	Senior Deputy Director (Air Traffic Services) Pakistan Civil Aviation Authority **PAKISTAN**
	106.	Mr. Muhammad Tanveer Akhtar	Deputy Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
	107.	Mr. Muhammad Usman Rasheed	Deputy Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**

	STATE/NAME		TITLE/ORGANIZATION
	108.	Mr. Nafeo Fazal	Senior Assistant Director (Air Traffic Services) Pakistan Civil Aviation Authority **PAKISTAN**
	109.	Mr. Majeedullah Niazi	AD (ATS) Pakistan Civil Aviation Authority **PAKISTAN**
	110.	Mr. Muhammad Sana Ullah	Assistant Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
	111.	Mr. Nauman Zahid	Assistant Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
18.	**PHILIPPINES (6)**		
	112.	Mr. Virgilio R. Cipriano	Facility In-Charge, ATFM Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**
	113.	Ms. Tamya Lemuria T. Sullivan	Assistant Facility In-Charge, ATFM Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**

	STATE/NAME		TITLE/ORGANIZATION
	114.	Mr. Ryan Cave	Air Traffic Management Officer I Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**
	115.	Mr. David B. Repancol	Officer In-Charge, ARCID Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
	116.	Mr. Roseller Nicanor A. De Dios	Senior Aviation Services Safety Inspector Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
	117.	Mr. Agustin V. Cabrera	Aviation Services Safety Inspector II, ATMSID Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
19.	**REPUBLIC OF KOREA (15)**		
	118.	Ms. Jung-ok Shin	Deputy Director Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	119.	Mr. Kyutae Kim	Assistant Director Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	120.	Ms. Sojin Lim	Assistant Officer Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	121.	Mr. Soonhyuck Lee	Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	122.	Mr. Soohwan Kim	Associate Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	123.	Mr. Haechan Noh	Associate Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	124.	Mr. Heonju Lee	Assistant Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	125.	Mr. Haeyong Park	Deputy General Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	126.	Mr. Seungryul, Lee	Senior Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	127.	Mr. Sangjeong Kim	Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	128.	Ms. Yeojin Kim	Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	129.	Mr. Shin Oungseob	Aviation Safety Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	130.	Ms. Jihyun Lee	Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	131.	Mr. Daygun Lee	Research Engineer Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	132.	Ms. Juhyeon Kim	Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
20.	**SINGAPORE (11)**		
	133.	Mr. Roger Lau	Chief ATM-2 Civil Aviation Authority of Singapore **SINGAPORE**
	134.	Mr. Joel Ng	Chief (Systems Planning) Civil Aviation Authority of Singapore **SINGAPORE**
	135.	Mr. Cheoh Wee Pin, Simon	Senior Air Traffic Control Manager Civil Aviation Authority of Singapore **SINGAPORE**
	136.	Ms. Fatin Zunairah Binte Zulkifli	Senior ATC Manager Civil Aviation Authority of Singapore **SINGAPORE**
	137.	Ms. Jialing He	Master Air Traffic Control Officer Civil Aviation Authority of Singapore **SINGAPORE**
	138.	Mr. David Shin Hwah Leow	Head (Air Traffic Management Software Engineering) Civil Aviation Authority of Singapore **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
	139.	Mr. Huanbin Zhang	Head (ATM – Development) Civil Aviation Authority of Singapore **SINGAPORE**
	140.	Mr. Clement Heng	Air Traffic Control Manager (ATM – Development) Civil Aviation Authority of Singapore **SINGAPORE**
	141.	Ms. Koh Wee Luan	Lead Air Traffic Control Officer Civil Aviation Authority of Singapore **SINGAPORE**
	142.	Mr. Wei Xiong Elvin Liow	Principal Engineer (ATM Software Engineering) Civil Aviation Authority of Singapore **SINGAPORE**
	143.	Mr. Jack Toh	Principal Engineer (Air Traffic Management Support Systems) Civil Aviation Authority of Singapore **SINGAPORE**
21.	**SRI LANKA (11)**		
	144.	Ms. Sherina Casseer	Deputy Director General Aeronautical Services Regulations Civil Aviation Authority of Sri Lanka **SRI LANKA**

	STATE/NAME		TITLE/ORGANIZATION
	145.	Mr. Thilina Warnasinghe	Senior Civil Aviation Inspector Civil Aviation Authority of Sri Lanka **SRI LANKA**
	146.	Mr. Jude Peiris	Senior Manager - ATC Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	147.	Mr. Aruna Fernando	Senior Manager - Air Traffic Control (Planning & Standards) Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	148.	Mr. Indika Bandupriya	Senior Manager ATS Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	149.	Ms. Chandana Kumara Kasturiratna,	Airport Manager Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	150.	Ms. Priyasha Hettiarachchi	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**

	STATE/NAME		TITLE/ORGANIZATION
	151.	Mr. Gayan Wijesundara	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	152.	Mr. Anuruddha Dissanayaka	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	153.	Ms. Manori Senarathne	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	154.	Mr. Prasanna Wijeratne	Electronics Engineer Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
22.	**THAILAND (32)**		
	155.	Mr. Jirakrit Thamnarak	Air Traffic Standard Oversight Division Officer The Civil Aviation Authority of Thailand **THAILAND**
	156.	Mr. Wongtawan Sawasdimongkol	Air Traffic Oversight Officer The Civil Aviation Authority of Thailand **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	157.	Ms. Pataraporn Jessadapornchai	Aerodrome Standards Development Officer The Civil Aviation Authority of Thailand **THAILAND**
	158.	Ms. Pinthong Choungchot	Aerodrome Standards Development Officer The Civil Aviation Authority of Thailand **THAILAND**
	159.	Mr. Sikarate Tarasak	Officer The Civil Aviation Authority of Thailand **THAILAND**
	160.	Ms. Kamonchanok Chuamnat	Officer The Civil Aviation Authority of Thailand **THAILAND**
	161.	Mr. Chaiwat Sekhew	Officer The Civil Aviation Authority of Thailand **THAILAND**
	162.	Ms. Wilasinee Phanngam	Transport Technical Officer Department of Airports of Thailand **THAILAND**
	163.	Ms. Ploykaprib Soralump	Transport Technical Officer Department of Airports of Thailand **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	164.	Mr. Suwichak Wongwises	Computer Technical Officer Department of Airports of Thailand **THAILAND**
	165.	Mr. Piyawut Tantimekabut	Air Traffic Management Network Manager Aeronautical Radio of Thailand Ltd. **THAILAND**
	166.	Ms. Amornrat Jirattigalachote	Strategic Planning Manager (Engineering) Aeronautical Radio of Thailand Ltd. **THAILAND**
	167.	Mr. Chairat Panpattrakul	Air Traffic Controller 2 Aeronautical Radio of Thailand Ltd. **THAILAND**
	168.	Mr. Sakon Sinlapakun	Senior Air Traffic Systems Engineer Aeronautical Radio of Thailand Ltd. **THAILAND**
	169.	Mr. Sugoon Fucharoen	Senior Air Traffic Management Data Officer Aeronautical Radio of Thailand Ltd. **THAILAND**
	170.	Mr. Dudsadee Sungthong	Senior Air Traffic Management Data Officer Aeronautical Radio of Thailand Ltd. **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	171.	Ms. Kasama Ketsuriyonk	Senior Air Traffic Systems Engineer Aeronautical Radio of Thailand Ltd. **THAILAND**
	172.	Flt. Lt. Pokpong Suwanmolee	Vice President, Airside Operations, BKK Airport Airports of Thailand Public Company Limited **THAILAND**
	173.	Pol. Lt. Col. Piti Trikalnon	Vice President, Airside Operations, DMK Airport Airports of Thailand Public Company Limited **THAILAND**
	174.	Mr. Adisak Toonsoongnern	Director Flight Service Division Airside Operations Department, Suvarnabhumi Airport Airports of Thailand Public Company Limited **THAILAND**
	175.	Ms. Saowakhon Tetiya	Aerodrome Safety Specialist Aviation Service Standard Division Aviation Services Standard Department Airports of Thailand Public Company Limited **THAILAND**
	176.	Ms. Sonthaya Iamsua	Administration Officer Airports of Thailand Public Company Limited **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	177.	Mr. Bunn Yomchinda	Administration Officer Airports of Thailand Public Company Limited **THAILAND**
	178.	Mr. Rajadej Komanant	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	179.	Ms. Threenuch Lueangwichit	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	180.	Ms. Suvachira Teeraphathananon	Senior Engineer, Airport Operation System Division, Department of Information Technology System Airports of Thailand Public Company Limited **THAILAND**
	181.	Ms. Supaphon Israngura na ayuthaya	Senior Analyst Airports of Thailand Public Company Limited **THAILAND**
	182.	Ms. Wongwaran Kongpolprom	Analyst, Airport Operation Development Division, Innovation and Knowledge Development Department Airport of Thailand Public Company Limited **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	183.	Mr. Nattapon Khonsue	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	184.	Ms. Napat Tangkananusorn	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	185.	Ms. Wachirakan Yaemmek	System Analyst Airport of Thailand Public Company Limited **THAILAND**
	186.	Mr. Chatthep Chittayawong	Analyst Airport of Thailand Public Company Limited **THAILAND**
23.	**UNITED STATES (2)**		
	187.	Mr. Shayne Campbell	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration **SINGAPORE**
	188.	Mr. Vern Payne	Manager, CDM and International Operations Federal Aviation Administration Air Traffic Control System Command Center **UNITED STATES**

	STATE/NAME		TITLE/ORGANIZATION
24.	**VIET NAM (10)**		
	189.	Mr. Lưu Văn Chiều	Official The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	190.	Mr. Ho Doan Trang	Officer The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	191.	Mr. Dong Anh Nguyen	ATFM Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	192.	Mr. Truong Nguyen Xuan	ATS Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	193.	Mr. Dinh Ngoc Tuyen	ATFM Specialist – Professional Department of Vietnam ATFM Center Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	194.	Mr. Loc Trinh	CNS System Engineer Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**

	STATE/NAME		TITLE/ORGANIZATION
	195.	Ms. Minh Khanh Nghiem Thi	International Relations Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	196.	Mr. Nguyen Hong Hiep	IT Sepcialist Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	197.	Ms. Hanh Hoa Bui	Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	198.	Mr. Thanh-Minh Phan	Lecture Vietnam Aviation Academy **VIET NAM**
25.	**CANSO (2)**		
	199.	Mr. Poh Theen Soh	Director Asia Pacific Affairs CANSO **SINGAPORE**
	200.	Mr. Stuart Ratcliffe	Co-Chair of the CANSO ATFM/A-CDM Work Group CANSO

	STATE/NAME		TITLE/ORGANIZATION
26.	**IATA (9)**		
	201.	Mr. John Moore	Assistant Director, Safety and Flight Operations, ASPAC IATA **SINGAPORE**
	202.	Mr. Prashant Sanglikar	Assistant Director- OSS (Safety & Flight Ops) ASPAC-Field Offices IATA **INDIA**
	203.	Mr. Richard Tan	Regional Manager Operations, Safety and Security – Asia Pacific IATA **SINGAPORE**
	204.	Mr. Ti Zhang	Manager Safety & ATFM Liaison IATA **CHINA**
	205.	Mr. George Chan	Regulatory Affairs Manager – Operations and Industry IATA **HONG KONG, CHINA**
	206.	Mr. Imshik Shin	Deputy General Manager – CNS/ATM IATA/Korean Air **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	207.	Mr. Julian Fung	International Operations Manager IATA **HONG KONG, CHINA**
	208.	Ms. Megan Yin	Manager – International Air Traffic System Asia Pacific United Airlines **CHINA**
	209.	Mr. Daniel Smith	Manager ATM Qantas Group **AUSTRALIA**
27.	**IFALPA (1)**		
	210.	Captain Max Matsumoto	Captain IFALPA **JAPAN**
28.	**IFATCA (2)**		
	211.	Ms. Cheryl YC Chen	EVP IFATCA – Asia and Pacific **CANADA**
	212.	Mr. John Wagstaff	Representative IFATCA – Asia and Pacific **CANADA**

	STATE/NAME		TITLE/ORGANIZATION
29.	**ICAO (8)**		
	213.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	214.	Mr. Shane Sumner	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	215.	Mr. Punya Raj Shakya	Regional Officer, Aerodrome and Ground Aids ICAO Asia and Pacific Regional Office **THAILAND**
	216.	Mr. Peter Dunda	Regional Officer, Aeronautical Meteorology/Environment ICAO Asia and Pacific Regional Office **THAILAND**
	217.	Mr. Manjunath K Nelli	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office **CHINA**
	218.	Mr. Vijay Kumar Mishra	Regional Officer, PBN ICAO Asia and Pacific Regional Sub-Office **CHINA**

	STATE/NAME		TITLE/ORGANIZATION
	219.	Mr. Ying Weng Kit	Air Traffic Management Officer ICAO Asia and Pacific Regional Office **THAILAND**
	220.	Ms. Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**

– – – – – – – – – – – – – –

ATFM/SG/12 List of Participants

	STATE/NAME		TITLE/ORGANIZATION
1.	**AUSTRALIA (5)**		
	1.	Mr. Simon Godsmark	Network Operations Manager Airservices Australia **AUSTRALIA**
	2.	Ms. Amber Raman	Manager Meteorological Authority Officer Australia Bureau of Meteorology **AUSTRALIA**
	3.	Mr. Ashwin Naidu	Aviation Customer Lead Australia Bureau of Meteorology **AUSTRALIA**
	4.	Ms. Emma Lybrand	Project Lead Australian Bureau of Meteorology **AUSTRALIA**
	5.	Mr. David Crock	Aviation Meteorologist Australian Bureau of Meteorology **AUSTRALIA**
2.	**BANGLADESH (4)**		
	6.	Mr. Md. Masud Rana	Deputy Director, ATM Division Civil Aviation Authority of Bangladesh **BANGLADESH**

	STATE/NAME		TITLE/ORGANIZATION
	7.	Mr. Mahmud Akhter Hossain	Assistant Director, Air Traffic Management Section, HSIA Civil Aviation Authority of Bangladesh **BANGLADESH**
	8.	Mr. Md. Abdun Noor Khan	Assistant Director Civil Aviation Authority of Bangladesh **BANGLADESH**
	9.	Mr. Kazi Khirul Kabir	Assistant Director Hazrat Shahjalal Int'l Airport, Dhaka Civil Aviation Authority of Bangladesh **BANGLADESH**
3.	**BHUTAN (1)**		
	10.	Mr. Karma Yonten	ATCO/AIS National Air Navigation Services Company (NANSC) **BHUTAN**
4.	**CAMBODIA (4)**		
	11.	Mr. Oun Makara	Chief of Air Traffic Services Air Navigation Standard and Safety Department State Secretariat of Civil Aviation **CAMBODIA**

	STATE/NAME		TITLE/ORGANIZATION
	12.	Mr. Vichcheka Buntong	ATM Supervisor Cambodia Air Traffic Services **CAMBODIA**
	13.	Mr. Khorn Vannak	Air Traffic Management Manager Cambodia Air Traffic Services **CAMBODIA**
	14.	Mr. Ngel Damrong	ATM Officer Cambodia Air Traffic Services **CAMBODIA**
5.	**CHINA (3)**		
	15.	Mr. Fu Yongqiang	Director, Sanya Area Control Office Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
	16.	Mr. Tan Wei	Assistant of ATC Division, Middle South Regional ATMB Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
	17.	Mr. Liu Hong	Senior Engineer Operation Supervisory Center Civil Aviation Administration of China **CHINA**

	STATE/NAME		TITLE/ORGANIZATION
6.	**HONG KONG, CHINA (5)**		
	18.	Mr. Alexander Ben Honig	Chief (Three-Runway System) Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	19.	Mr. Anfernee Poon	Senior Operations Officer (Strategic Planning) Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	20.	Mr. Chin Ting Fok	Air Traffic Control Officer / Project Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	21.	Mr. Wing Yan Au	Air Traffic Control Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
	22.	Mr. Alex Lok Man Leung	Conversion and Training Officer Hong Kong Civil Aviation Department **HONG KONG, CHINA**
7.	**FIJI (4)**		
	23.	Ms. Alisi Namoro	ANSI-ATM/SAR Civil Aviation Authority of Fiji **FIJI**

	STATE/NAME		TITLE/ORGANIZATION
	24.	Mr. Makiti Raratabu	Air Navigation Services Inspector - ATM/MET Civil Aviation Authority of Fiji **FIJI**
	25.	Mr. Ivan Wong	Head of Operations Air Traffic Management Fiji Airports **FIJI**
	26.	Mr. Ilimeleki Navula	Controller Standards/SAR – ATM Fiji Airports **FIJI**
8.	**INDIA (11)**		
	27.	Mrs. Archana Sunil Jadoo	Assistant Director Directorate General of Civil Aviation India **INDIA**
	28.	Mr. Akash Kumar	Assistant Director (Operations) Directorate General of Civil Aviation India **INDIA**
	29.	Mr. Barun Kumar Sarkar	Executive Director (ATM), Air Traffic Flow Management Airports Authority of India **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	30.	Mr. Partha Pratim Banerjee	Joint General Manager Airports Authority of India **INDIA**
	31.	Mr. Sudhanshu Gupta	Joint General Manager (ATM) Airports Authority of India **INDIA**
	32.	Mr. Anup Kumar	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	33.	Mr. Naresh Kumar Chaudhary	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	34.	Ms. Vineeta Upadhyay	Joint General Manager (ATM-ATFM) Airports Authority of India **INDIA**
	35.	Mr. Abhishek Raj	Manager (ATM) Airports Authority of India **INDIA**
	36.	Mr. Ajay Kumar	Assistant Manager (ATM-ATFM) Airports Authority of India **INDIA**

	STATE/NAME		TITLE/ORGANIZATION
	37.	Mr. S V Manohj	Assistant Manager, Air Traffic Management Airports Authority of India **INDIA**
9.	**INDONESIA (7)**		
	38.	Mr. Rachmat Widiyana	ATFM and CDM Planning Manager AirNav Indonesia **INDONESIA**
	39.	Mr. Dedy Syahputra	Junior Manager ATFM & ATS System AirNav Indonesia **INDONESIA**
	40.	Mr. Hari Purwanto	Junior Manager ATFM AirNav Indonesia **INDONESIA**
	41.	Mr. Faisal Riza	Junior Manager ATFM & ATS System AirNav Indonesia **INDONESIA**
	42.	Ms. Zakiah Agus	ATFM Staff AirNav Indonesia **INDONESIA**

	STATE/NAME		TITLE/ORGANIZATION
	43.	Ms. Putri Diana Tarigan	Aeronautical Meteorology Management Operational Officer Indonesia Meteorology Climatology and Geophysics Agency **INDONESIA**
	44.	Ms. Ire Pratiwi	Aviation Forecaster BKMG Indonesia **INDONESIA**
10.	**JAPAN (16)**		
	45.	Mr. Takayuki Harada	Director, Air Traffic International Office Japan Civil Aviation Bureau (JCAB) **JAPAN**
	46.	Ms. Kyoko Sato	Special Assistant of the Director Ministry of Land, Infrastructure, Transport and Tourism, Government of Japan **JAPAN**
	47.	Mr. Yukio Imada	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	48.	Ms. Miho Itou	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**

	STATE/NAME		TITLE/ORGANIZATION
	49.	Mr. Hitoshi Makino	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	50.	Mr. Kentari Suzuki	Special assistant to the Director Japan Civil Aviation Bureau (JCAB) **JAPAN**
	51.	Mr. Akihiro Yamamoto	Chief of Flight Information Second Section Japan Civil Aviation Bureau (JCAB) **JAPAN**
	52.	Mr. Tetsya Nozaki	Assistant Chief Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	53.	Mr. Kenichi Yamakawa	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	54.	Mr. Kentaro Yamauchi	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	55.	Ms. Nozomi Yagi	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**

	STATE/NAME		TITLE/ORGANIZATION
	56.	Mr. Takanori Okamoto	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	57.	Ms. Oikawa Ayako	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	58.	Ms. Satomi Tajima	Air Traffic Management Officer Japan Civil Aviation Bureau (JCAB) **JAPAN**
	59.	Mr. Yuki Kato	Senior Forecaster Japan Meteorological Agency **JAPAN**
	60.	Ms. Michiko Ikeda	Scientific Officer Japan Meteorological Agency **JAPAN**
11.	**LAO PDR (6)**		
	61.	Mr. Thanongdeth Nalisak	Deputy Director of Air Navigation Standards Division Department of Civil Aviation of Lao PDR **LAO PDR**

	STATE/NAME		TITLE/ORGANIZATION
	62.	Mr. Xayphone Latxavong	ATM and SAR Officer Air Navigation Standards Division Department of Civil Aviation of Lao PDR **LAO PDR**
	63.	Mr. Maity SYLITHAMMAVONG	Director of ATS Division Air Traffic Service Division Lao Air Navigation Services **LAO PDR**
	64.	Mr. Khamsing boualaphanh	ATFM Air Navigation Service Division Lao Air Navigation Services **LAO PDR**
	65.	Mrs. Roungaroun CHANTHAVONG	ATC Air Navigation Service Division Lao Air Navigation Services **LAO PDR**
	66.	Mr. Neekhom Khanhavong	ATC Air Navigation Service Division Lao Air Navigation Services **LAO PDR**
12.	**MALAYSIA (5)**		
	67.	Ms. Nor Kamilia Nordin	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**

	STATE/NAME		TITLE/ORGANIZATION
	68.	Mr. Gillian Masudal	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**
	69.	Mr. Thomas Luther Albert Jimoni	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**
	70.	Mr. Sharudin Hashim	Air Traffic Controller Civil Aviation Authority of Malaysia **MALAYSIA**
	71.	Mr. Azlan bin Awang Satariah	Kuching ATCC Air Traffic Controller (aerodrome, area procedural, area radar, approach procedural, approach radar) Civil Aviation Authority of Malaysia **MALAYSIA**
13.	**MONGOLIA (3)**		
	72.	Mr. Batbayar Turbat	Director Air Traffic Flow Management Division, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**

	STATE/NAME		TITLE/ORGANIZATION
	73.	Mrs. Altanzul Tumur	Head Technology & Survey Section, Air Traffic Flow Management Division, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**
	74.	Mrs. Uyanga Bayarkhuu	Officer Air Navigation Services Department, National Civil Aviation Center, Civil Aviation Authority of Mongolia **MONGOLIA**
14.	**MYANMAR (1)**		
	75.	Ms. Ohnmar Tun	Assistant General Manager Department of Civil Aviation of Myanmar **MYANMAR**
15.	**NEPAL (11)**		
	76.	Mr. Sanjay Kumar	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	77.	Mr. Sitaram Bhandari	Deputy Director Civil Aviation Authority of Nepal, **NEPAL**

	STATE/NAME		TITLE/ORGANIZATION
	78.	Mr. Dipak Kumar Bajracharya	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	79.	Mr. Babu Raja Nakarmi	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	80.	Mr. Upaj Dhakal	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	81.	Mr. Dinesh Raj Ghimire	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	82.	Mr. Devendra Prasad Shrestha	Deputy Director Civil Aviation Authority of Nepal **NEPAL**
	83.	Ms. Rita Shrestha	Manager Civil Aviation Authority of Nepal **NEPAL**
	84.	Mr. Rabindra Maharjan	ATM Inspector Civil Aviation Authority of Nepal **NEPAL**

	STATE/NAME		TITLE/ORGANIZATION
	85.	Mr. Mahendra Humagai,	Air Traffic Controller Civil Aviation Authority of Nepal **NEPAL**
	86.	Mr. Shyam Kishor	Director Tribhuvan International Airport Civil Aviation Office **NEPAL**
16.	**NEW ZEALAND (3)**		
	87.	Mr. Edmund Heng	Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand **NEW ZEALAND**
	88.	Mr. Peter Blair	ANS Requirement Team Leader Airways New Zealand **NEW ZEALAND**
	89.	Mr. Dan Stevens	Policy and Standards Specialist Airways New Zealand **NEW ZEALAND**
17.	**PAKISTAN (12)**		
	90.	Mr. Khurram Shahzad Akram	Director SQMS Pakistan Civil Aviation Authority - SQMS Directorate **PAKISTAN**

	STATE/NAME		TITLE/ORGANIZATION
	91.	Mr. M. Sarfaraz Gohar	Senior Joint Director ATS Pakistan Civil Aviation Authority **PAKISTAN**
	92.	Mr. Shahid Hussain	Senior Joint Director, Com-Ops Pakistan Civil Aviation Authority – Ops. Directorate **PAKISTAN**
	93.	Mr. Zulfiqar Alam	Joint Director (ATS) Pakistan Civil Aviation Authority **PAKISTAN**
	94.	Ms. Noor Bano	Joint Director Communication Operations Pakistan Civil Aviation Authority – Ops. Directorate **PAKISTAN**
	95.	Mr. Ali Hassan	Senior Deputy Director (Air Traffic Services) Pakistan Civil Aviation Authority **PAKISTAN**
	96.	Mr. Muhammad Tanveer Akhtar	Deputy Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
	97.	Mr. Muhammad Usman Rasheed	Deputy Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**

	STATE/NAME		TITLE/ORGANIZATION
	98.	Mr. Nafeo Fazal	Senior Assistant Director (Air Traffic Services) Pakistan Civil Aviation Authority **PAKISTAN**
	99.	Mr. Majeedullah Niazi	AD (ATS) Pakistan Civil Aviation Authority **PAKISTAN**
	100.	Mr. Muhammad Sana Ullah	Assistant Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
	101.	Mr. Nauman Zahid	Assistant Director Communication Operations Pakistan Civil Aviation Authority **PAKISTAN**
18.	**PHILIPPINES (6)**		
	102.	Mr. Virgilio R. Cipriano	Facility In-Charge, ATFM Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**
	103.	Ms. Tamya Lemuria T. Sullivan	Assistant Facility In-Charge, ATFM Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**

	STATE/NAME		TITLE/ORGANIZATION
	104.	Mr. Ryan Cave	Air Traffic Management Officer I Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**
	105.	Mr. David B. Repancol	Officer In-Charge, ARCID Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
	106.	Mr. Roseller Nicanor A. De Dios	Senior Aviation Services Safety Inspector Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
	107.	Mr. Agustin V. Cabrera	Aviation Services Safety Inspector II, ATMSID Aerodrome and Air Navigation Safety Oversight Office Civil Aviation Authority of the Philippines **PHILIPPINES**
19.	**REPUBLIC OF KOREA (21)**		
	108.	Ms. Jung-ok Shin	Deputy Director Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	109.	Ms. Seung-won Chang	Deputy Director, Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	110.	Mr. Kyutae Kim	Assistant Director Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	111.	Ms. Sojin Lim	Assistant Officer Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	112.	Mr. Sang-il Lee	Assistant Director, Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) **REPUBLIC OF KOREA**
	113.	Mr. Soonhyuck Lee	Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	114.	Mr. Soohwan Kim	Associate Manager Korea Airports Corporation **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	115.	Mr. Haechan Noh	Associate Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	116.	Mr. Heonju Lee	Assistant Manager Korea Airports Corporation **REPUBLIC OF KOREA**
	117.	Ms. Nam Hyojeon	Air Traffic Flow Management Korea Airports Corporation **REPUBLIC OF KOREA**
	118.	Mr. Kim Hyunwoo	Air Traffic Flow Management Korea Airports Corporation **REPUBLIC OF KOREA**
	119.	Mr. Heungback Choi	Airside Operator Korea Airports Corporation **REPUBLIC OF KOREA**
	120.	Mr. Haeyong Park	Deputy General Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	121.	Mr. Seungryul, Lee	Senior Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
	122.	Mr. Sangjeong Kim	Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	123.	Mr. JJ Kim	Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	124.	Ms. Yeojin Kim	Manager Incheon International Airport Corporation **REPUBLIC OF KOREA**
	125.	Mr. Shin Oungseob	Aviation Safety Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	126.	Ms. Jihyun Lee	Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	127.	Mr. Daygun Lee	Research Engineer Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**
	128.	Ms. Juhyeon Kim	Researcher Korea Institute of Aviation Safety Technology **REPUBLIC OF KOREA**

	STATE/NAME		TITLE/ORGANIZATION
20.	**SINGAPORE (12)**		
	129.	Mr. Roger Lau	Chief ATM-2 Civil Aviation Authority of Singapore **SINGAPORE**
	130.	Mr. Joel Ng	Chief (Systems Planning) Civil Aviation Authority of Singapore **SINGAPORE**
	131.	Mr. Cheoh Wee Pin, Simon	Senior Air Traffic Control Manager Civil Aviation Authority of Singapore **SINGAPORE**
	132.	Ms. Fatin Zunairah Binte Zulkifli	Senior ATC Manager Civil Aviation Authority of Singapore **SINGAPORE**
	133.	Ms. Jialing He	Master Air Traffic Control Officer Civil Aviation Authority of Singapore **SINGAPORE**
	134.	Mr. David Shin Hwah Leow	Head (Air Traffic Management Software Engineering) Civil Aviation Authority of Singapore **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
	135.	Mr. Huanbin Zhang	Head (ATM – Development) Civil Aviation Authority of Singapore **SINGAPORE**
	136.	Mr. Clement Heng	Air Traffic Control Manager (ATM – Development) Civil Aviation Authority of Singapore **SINGAPORE**
	137.	Ms. Koh Wee Luan	Lead Air Traffic Control Officer Civil Aviation Authority of Singapore **SINGAPORE**
	138.	Mr. Wei Xiong Elvin Liow	Principal Engineer (ATM Software Engineering) Civil Aviation Authority of Singapore **SINGAPORE**
	139.	Mr. Jack Toh	Principal Engineer (Air Traffic Management Support Systems) Civil Aviation Authority of Singapore **SINGAPORE**
	140.	Mr. Jackson Ho	Senior Engineer (ATM Software Engineering) Civil Aviation Authority of Singapore **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
21.	**SRI LANKA (11)**		
	141.	Ms. Sherina Casseer	Deputy Director General Aeronautical Services Regulations Civil Aviation Authority of Sri Lanka **SRI LANKA**
	142.	Mr. Thilina Warnasinghe	Senior Civil Aviation Inspector Civil Aviation Authority of Sri Lanka **SRI LANKA**
	143.	Mr. Jude Peiris	Senior Manager - ATC Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	144.	Mr. Aruna Fernando	Senior Manager - Air Traffic Control (Planning & Standards) Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	145.	Mr. Indika Bandupriya	Senior Manager ATS Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**

	STATE/NAME		TITLE/ORGANIZATION
	146.	Ms. Chandana Kumara Kasturiratna,	Airport Manager Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	147.	Ms. Priyasha Hettiarachchi	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	148.	Mr. Gayan Wijesundara	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	149.	Mr. Anuruddha Dissanayaka	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	150.	Ms. Manori Senarathne	Air Traffic Controller Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**
	151.	Mr. Prasanna Wijeratne	Electronics Engineer Airport and Aviation Services (Sri Lanka) (Private) Limited **SRI LANKA**

		STATE/NAME	TITLE/ORGANIZATION
22.	**THAILAND (31)**		
	152.	Mr. Jirakrit Thamnarak	Air Traffic Standard Oversight Division Officer The Civil Aviation Authority of Thailand **THAILAND**
	153.	Mr. Wongtawan Sawasdimongkol	Air Traffic Oversight Officer The Civil Aviation Authority of Thailand **THAILAND**
	154.	Ms. Pataraporn Jessadapornchai	Aerodrome Standards Development Officer The Civil Aviation Authority of Thailand **THAILAND**
	155.	Ms. Pinthong Choungchot	Aerodrome Standards Development Officer The Civil Aviation Authority of Thailand **THAILAND**
	156.	Mr. Sikarate Tarasak	Officer The Civil Aviation Authority of Thailand **THAILAND**
	157.	Ms. Kamonchanok Chuamnat	Officer The Civil Aviation Authority of Thailand **THAILAND**
	158.	Mr. Chaiwat Sekhew	Officer The Civil Aviation Authority of Thailand **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	159.	Ms. Wilasinee Phanngam	Transport Technical Officer Department of Airports of Thailand **THAILAND**
	160.	Ms. Ploykaprib Soralump	Transport Technical Officer Department of Airports of Thailand **THAILAND**
	161.	Mr. Suwichak Wongwises	Computer Technical Officer Department of Airports of Thailand **THAILAND**
	162.	Mr. Piyawut Tantimekabut	Air Traffic Management Network Manager Aeronautical Radio of Thailand Ltd. **THAILAND**
	163.	Ms. Amornrat Jirattigalachote	Strategic Planning Manager (Engineering) Aeronautical Radio of Thailand Ltd. **THAILAND**
	164.	Ms. Sasiprapa Praedum	Air Traffic Control Manager Bangkok and ATM-TWG Thailand Aeronautical Radio of Thailand Ltd. **THAILAND**
	165.	Mr. Chairat Panpattrakul	Air Traffic Controller 2 Aeronautical Radio of Thailand Ltd. **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	166.	Mr. Sakon Sinlapakun	Senior Air Traffic Systems Engineer Aeronautical Radio of Thailand Ltd. **THAILAND**
	167.	Mr. Sugoon Fucharoen	Senior Air Traffic Management Data Officer Aeronautical Radio of Thailand Ltd. **THAILAND**
	168.	Mr. Dudsadee Sungthong	Senior Air Traffic Management Data Officer Aeronautical Radio of Thailand Ltd. **THAILAND**
	169.	Ms. Kasama Ketsuriyonk	Senior Air Traffic Systems Engineer Aeronautical Radio of Thailand Ltd. **THAILAND**
	170.	Flt. Lt. Pokpong Suwanmolee	Vice President, Airside Operations, BKK Airport Airports of Thailand Public Company Limited **THAILAND**
	171.	Pol. Lt. Col. Piti Trikalnon	Vice President, Airside Operations, DMK Airport Airports of Thailand Public Company Limited **THAILAND**
	172.	Mr. Adisak Toonsoongnern	Director Flight Service Division Airside Operations Department, Suvarnabhumi Airport Airports of Thailand Public Company Limited **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	173.	Ms. Saowakhon Tetiya	Aerodrome Safety Specialist Aviation Service Standard Division Aviation Services Standard Department Airports of Thailand Public Company Limited **THAILAND**
	174.	Ms. Sonthaya Iamsua	Administration Officer Airports of Thailand Public Company Limited **THAILAND**
	175.	Mr. Bunn Yomchinda	Administration Officer Airports of Thailand Public Company Limited **THAILAND**
	176.	Mr. Rajadej Komanant	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	177.	Ms. Threenuch Lueangwichit	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	178.	Ms. Suvachira Teeraphathananon	Senior Engineer, Airport Operation System Division, Department of Information Technology System Airports of Thailand Public Company Limited **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	179.	Ms. Supaphon Israngura na ayuthaya	Senior Analyst Airports of Thailand Public Company Limited **THAILAND**
	180.	Ms. Wongwaran Kongpolprom	Analyst, Airport Operation Development Division, Innovation and Knowledge Development Department Airport of Thailand Public Company Limited **THAILAND**
	181.	Mr. Nattapon Khonsue	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	182.	Ms. Napat Tangkananusorn	Senior Airport Operations Officer Airports of Thailand Public Company Limited **THAILAND**
	183.	Ms. Wachirakan Yaemmek	System Analyst Airport of Thailand Public Company Limited **THAILAND**
	184.	Mr. Chatthep Chittayawong	Analyst Airport of Thailand Public Company Limited **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
23.	**UNITED STATES (2)**		
	185.	Mr. Shayne Campbell	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration **SINGAPORE**
	186.	Mr. Vern Payne	Manager, CDM and International Operations Federal Aviation Administration Air Traffic Control System Command Center **UNITED STATES**
24.	**VIET NAM (14)**		
	187.	Mr. Lưu Văn Chiều	Official The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	188.	Mr. Ho Doan Trang	Officer The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	189.	Mr. Nguyen Huu Duc	Official The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	190.	Mr. Pham Van Hoi	Deputy Manager of CSN Operations - ATFM Center Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**

	STATE/NAME		TITLE/ORGANIZATION
	191.	Mr. Nguyen Huu Son	Deputy Director of SQS Department Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	192.	Mr. Cao Thanh Phuc	Official of SQSD Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	193.	Mr. Luu Quang Trung	Official of SQSD Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	194.	Mr. Dong Anh Nguyen	ATFM Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	195.	Mr. Truong Nguyen Xuan	ATS Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**

	STATE/NAME		TITLE/ORGANIZATION
	196.	Mr. Dinh Ngoc Tuyen	ATFM Specialist – Professional Department of Vietnam ATFM Center Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	197.	Mr. Loc Trinh	CNS System Engineer Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	198.	Ms. Minh Khanh Nghiem Thi	International Relations Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	199.	Mr. Nguyen Hong Hiep	IT Sepcialist Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	200.	Ms. Hanh Hoa Bui	Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
25.	**CANSO (2)**		
	201.	Mr. Poh Theen Soh	Director Asia Pacific Affairs CANSO **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
	202.	Mr. Stuart Ratcliffe	Co-Chair of the CANSO ATFM/A-CDM Work Group CANSO
26.	**IATA (10)**		
	203.	Mr. John Moore	Assistant Director, Safety and Flight Operations, ASPAC IATA **SINGAPORE**
	204.	Mr. Prashant Sanglikar	Assistant Director- OSS (Safety & Flight Ops) ASPAC-Field Offices IATA **INDIA**
	205.	Mr. Richard Tan	Regional Manager Operations, Safety and Security – Asia Pacific IATA **SINGAPORE**
	206.	Mr. Ti Zhang	Manager Safety & ATFM Liaison IATA **CHINA**
	207.	Mr. George Chan	Regulatory Affairs Manager – Operations and Industry IATA **HONG KONG, CHINA**

	STATE/NAME		TITLE/ORGANIZATION
	208.	Mr. Imshik Shin	Deputy General Manager – CNS/ATM IATA/Korean Air **REPUBLIC OF KOREA**
	209.	Mr. Julian Fung	International Operations Manager IATA **HONG KONG, CHINA**
	210.	Ms. Megan Yin	Manager – International Air Traffic System Asia Pacific United Airlines **CHINA**
	211.	Mr. Daniel Smith	Manager ATM Qantas Group **AUSTRALIA**
	212.	Mr. Mark Hebert	Manager Flight Dispatch Quality and Training Air Canada **CANADA**
27.	**IFALPA (1)**		
	213.	Captain Max Matsumoto	Captain IFALPA **JAPAN**

	STATE/NAME		TITLE/ORGANIZATION
28.	**IFATCA (2)**		
	214.	Ms. Cheryl YC Chen	EVP IFATCA – Asia and Pacific **CANADA**
	215.	Mr. John Wagstaff	Representative IFATCA – Asia and Pacific **CANADA**
29.	**ICAO (9)**		
	216.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	217.	Mr. Shane Sumner	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	218.	Mr. Punya Raj Shakya	Regional Officer, Aerodrome and Ground Aids ICAO Asia and Pacific Regional Office **THAILAND**
	219.	Mr. Peter Dunda	Regional Officer, Aeronautical Meteorology/Environment ICAO Asia and Pacific Regional Office **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	220.	Mr. Manjunath K Nelli	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office **CHINA**
	221.	Mr. Vijay Kumar Mishra	Regional Officer, PBN ICAO Asia and Pacific Regional Sub-Office **CHINA**
	222.	Ms. Sunok Lee	Regional Officer ATM ICAO Asia and Pacific Regional Sub-Office **CHINA**
	223.	Mr. Ying Weng Kit	Air Traffic Management Officer ICAO Asia and Pacific Regional Office **THAILAND**
	224.	Ms. Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**

– – – – – – – – – – – – – –

LIST OF WORKING PAPERS AND INFORMATION PAPERS

WORKING PAPERS

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/1	1	Provisional Agenda	Chairman
WP/2	2	Related Meetings Outcomes	Secretariat
WP/3	2	Review outcomes from MET/R WG/11	MET R/WG Ad-hoc Group
WP/4	4	BOBCAT Operational Updates	Thailand
WP/5	4	Progress Update from Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration	China, Hong Kong China, Singapore, Thailand, CANSO and IATA
WP/6	4	NARAHG Update	China, Japan and Republic of Korea
WP/7	4	ATFM Collaboration among EATMCG Members Using Multi-Nodal ATFM Concept of Operation	Hong Kong China, Japan, Philippines, Republic of Korea
WP/8	4	Recommended Procedure for GDP Operation Trial	Hong Kong China, Japan, Philippines, and Republic of Korea
WP/9	4	Progress for ATFM and A-CDM Integration in Japan	Japan
WP/10	4	Addressing of Flight Plans and Missing (DEP) Messages	Secretariat
WP/11	4	Analysis of Missing Departure (DEP) Messages	India
WP/12	4	Regional ATFM Implementation Status	Secretariat
WP/13	4	ATFM in the contingency situation	Secretariat
WP/14	4	Lead time of flight plan filing to enhance demand predictability	Hong Kong China
WP/15	5	Progress of the ATFM Information Requirement Small Working Group (ATFM/IR/SWG)	ATFM/IR/SWG
WP/16	5	Update of Regional ATFM monitoring and reporting form	Secretariat

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/17	5	Update on Information Exchange Model Development to support ATFM Operations, ATFM/A-CDM Integration, and FF-ICE/TBO in Asia/Pacific Region	Japan, Singapore, Thailand, and USA
WP/18	6	ATFM Points of Contact	Secretariat
WP/19	7	Terms of Reference and Task List	Secretariat
WP/20	4	Benefits of Implementing GDPs over MINIT/MITs	Hong Kong China, Singapore and Thailand

INFORMATION PAPERS

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/1	-	Provisional List of Papers	Secretariat
IP/2	-	ATFM/A-CDM Integration Webinar Outcome	Secretariat

PRESENTATIONS

NUMBER	AGENDA	PRESENTATIONS	PRESENTED BY
SP/1 (WP/4)	~~4~~	BOBCAT Operational Updates	Thailand
SP/2 (WP/5)	~~4~~	Progress Update from Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration	China, Hong Kong China, Singapore, Thailand, CANSO and IATA
SP/3 (WP/11)	4	Analysis of Missing Departure Messages	India
SP/4 (WP/6)	4	NARAHG Update	China, Japan and Republic of Korea
SP/5 (WP/9)	4	Progress for ATFM and A-CDM Integration in Japan	Japan
SP/6 (WP/7)	4	Progress Updates on ATFM Collaboration among EATMCG Members	Hong Kong China, Japan, Philippines, Republic of Korea
SP/7 (WP/14)	4	Lead time of flight plan filing to enhance demand predictability	Hong Kong China

……

INTERNATIONAL CIVIL AVIATION ORGANIZATION

D R A F T

ASIA/PACIFIC

REGIONAL FRAMEWORK

FOR

COLLABORATIVE AIR TRAFFIC FLOW MANAGEMENT

DRAFT Version 4.0

This Plan was developed by the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG)

Approved by XX Meeting of ATM Sub-Group of APANPIRG and published by the ICAO Asia and Pacific Office, Bangkok

CONTENTS

SCOPE OF THE FRAMEWORK

Background of Regional Air Traffic Flow management

1.1. The 24th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/24), held in June 2013, considered that with the strong growth of air traffic in the Asia Pacific Region there was a need to effectively manage demand and capacity, particularly at major international air hubs and in the associated major traffic flows (MTF).

1.2. The airspace of the Asia/Pacific Region, particularly that of South East Asia, is characterized by relatively small FIRs with corresponding low flight transit times. Any demand management process applied unilaterally in one FIR has a knock-on effect in multiple 'downstream' FIRs, and procedures applied are therefore structured around the lowest capability along any particular route/flow. 'Flow Management' in the region tended to be limited to rudimentary traffic spacing measures imposed by individual FIRs, rather taking a wider network view that optimizes available capacity and manages demand, only when necessary, on a sub-regional basis.

1.3. The Asia/Pacific Seamless ANS Plan provides a blueprint for coordinated Regional development, including capability improvements described in the ICAO Aviation System Block Upgrades (ASBU) roadmap. Air Traffic Flow Management (ATFM) taking a network view, is a key module in ASBU Block Zero and One. NOPS-B0/1-5 -Improved Flow Performance through Planning based on a Network- Wide view have since been identified by APANPIRG as one of sixteen priorities for the Asia/Pacific Region.

1.4. While the concept of a single ATFM entity to serve a region works well in Europe and North America, a centralized ATFM Unit (ATFMU) approach is not practicable for the Asia/Pacific region. The need for a regional ATFM framework focusing on sub-regional, multi-State implementation, rather than individual FIR-based programs, was recognized by APANPIRG/24 in its adoption of the following Conclusion:

> *Conclusion 24/15: Asia/Pacific ATFM Steering Group*
>
> *That, States participate in, and support the Asia/Pacific ATFM Steering Group to develop a common Regional ATFM framework, which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific region.*

1.5. This document, the Asia/Pacific Regional Framework for Collaborative ATFM (the Framework) is intended to provide a common regional framework that addresses ATFM implementation and ATFM operational issues in the Asia/Pacific region. Further discussed in later sections, a core concept of the Framework, is the distributed multi-nodal ATFM network, envisaged as interconnected States and/or sub-Regional groups operating in an ATFM network without the need for any central, physical facility providing the network management function.

1.6. Doc 9971 states that in its initial application, ATFM need not involve complicated processes, procedures or tools. The goal is to collaborate with system stakeholders and to communicate operational information to airspace users, air navigation service providers, and to other stakeholders in a timely manner.

1.7. Version 3.0 of the Framework included near to medium term performance objectives to prepare and guide States in the implementation of collaborative, cross- border ATFM, providing for regionally harmonized ATFM concepts, communications and practices.

1.8. The present Version of the Framework recognises that many States are progressing, albeit slowly, towards implementing Air Traffic Flow Management systems and procedures in their areas in conformity with the Regional ATFM Framework. In order to encourage greater harmonization and ensure interoperability of various national and sub-regional ATFM implementation programs in the region, the Framework has further expanded the previous performance expectations in the medium term.

Framework Structure

1.9. The Framework, developed by the Asia/Pacific ATFM Steering Group (ATFM/SG),forms part of a suite of global and regional air navigation planning documents relevant to the Asia/Pacific Region.

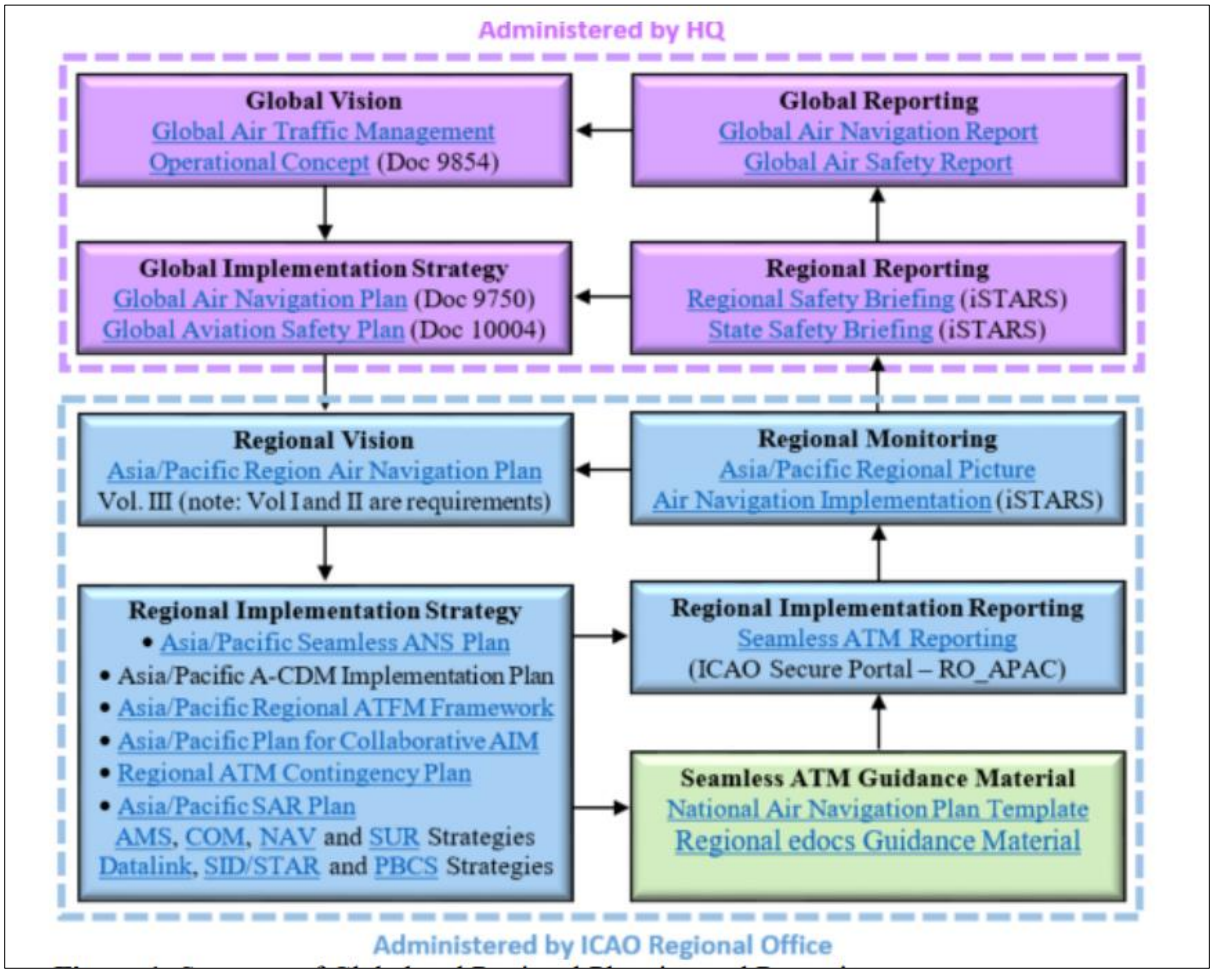


Figure 1 : Hierarchy of Global and Regional Plans

1.10. Global vision and strategy perspectives are provided by the Global ATM Operational Concept (Doc 9854), Global Air Navigation Plan (GANP, Doc 9750), and Global Aviation Safety Plan (GASP, Doc 10004), as shown in Figure 1 above. The GANP includes the Aviation System Block Upgrade (ASBU) framework, its Modules and its associated technology Roadmaps.

1.11. Beneath this level is regional planning primarily provided by the Asia/Pacific Regional Air Navigation Plan (RANP, Doc 9673) and the Asia/Pacific Seamless ANS Plan which, together with

its contributory documents, including this Framework, define goals and the means of meeting State planning objectives.

1.12. Now incorporated within the Seamless ANS Plan are the earlier Asia/Pacific ATFM Concept of Operations and Air Navigation Concept of Operations. The Framework draws upon and aligns with the guidance and recommendations of ICAO Doc 9971 Manual on Collaborative ATFM, and with the regional performance improvement expectations of the Seamless ANS Plan.

1.13. The Framework includes analysis of the current situation, a performance improvement plan, and considerations for research and future development.

1.14. The Framework includes reference to Asia Pacific Airport Collaborative Decision Making (A-CDM) Implementation Plan which was developed to foster harmonized and interoperable A-CDM Implementation in the region. The framework further elaborates on need for ATFM and A-CDM integration and requirements. A-CDM-related performance expectations at A-CDM airports are illustrated in the APAC A-CDM Implementation plan to map with APAC Seamless ANS Plan and Regional Framework for Collaborative ATFM expectations.

1.15. The performance objectives of the Framework are expected to be implemented in phases aligned, where practicable, with those of the Seamless ANS Plan. Having considered the Phased expectations of the Seamless Plan, Regional ATFM Capability is expected to be implemented in the following phases.

- Phase IA, expected implementation by 12 November 2015 (aligned with Seamless ANS Plan Phase I)
- Phase IB, expected implementation by 25 May 2017 and
- Phase II expected implementation by 07 November 2019 (Aligned with Seamless ANS Plan Phase II.)
- Phase III A expected implementation by November 2022
- Phase III B expected implementation by November 2025.

1.16. None of the above phases or any element of the Framework is binding on any State, and they should be considered as a planning framework. It is important to note that, like the Seamless ANS Plan, the Framework's Phase commencement dates are planning targets. They should not be treated as a 'hard' date such as the example of Reduced Vertical Separation Minimum (RVSM) implementation. In that case there was a potential major regional problem if all States did not implement at the same time by the specific agreed date, which is clearly not the case for the start of the Framework Phases.

1.17. In that regard, although it would be ideal if all States achieved capability on day one of Phase I, this is probably not realistic. States should, however, consider the impact on stakeholders and on the needed improvements in cross-border ATFM and the ATM system overall that would result from not achieving target implementation dates. The Seamless ANS Plan Phase dates, and hence the Framework dates, were chosen as being an achievable target for the majority of States. However the dates were not designed to accommodate the least capable State, otherwise the region as a whole would fall behind the necessary urgent ATM improvements required by the Directors General of Civil Aviation and APANPIRG.

Document Review

1.18. The Framework is intended to be reviewed following the planned review of the Seamless ANS Plan and thereafter each three years, following the regular review of the Seamless ANS Plan.

Earlier or more frequent review and amendment will be conducted as recommended by ATFM/SG and agreed by APANPIRG, through its Air Traffic Management (ATM) Sub-Group (ATM/SG).

DEVELOPMENT AND OBJECTIVES OF THE FRAMEWORK

Framework development

2.1. The Asia Pacific Region Air Traffic Flow Management Steering Group (ATFM/SG) was formed by the Asia/Pacific Region Air Navigation Planning and Implementation Regional Group (APANPIRG) to inter alia, develop a common Regional ATFM framework which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific Region.

2.2. The Version 3.0 of the Framework was developed over four meetings of the ATFM/SG, supported by offline work by a team of specialists drawn from within the Steering Group. The Framework was endorsed by the 26th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/26, Bangkok, Thailand, 7 to 10 September 2015).

2.3. The Framework draws on relevant experience gained in Asia/Pacific States, and in other Regions. Key concepts used or adapted in the Framework include:

- A distributed multi-nodal cross-border ATFM network rather than a regionally centralized facility;
- An agreed model for ATFM information exchange;
- An agreed suite of ATFM terminologies for use in ATFM systems and processes, and in interfaces with other complementary systems;
- Meteorological forecasting information tailored for ATFM purposes; and
- Delay absorption intent, allowing aircraft operators to flexibly distribute their total ATFM delay across various phases of flight.

2.4. The performance objectives of the Framework are, wherever practicable, aligned with the ATFM-related objectives and implementation timelines of the Asia/Pacific Seamless ANS Plan.

Framework Objective

2.5. Having considered relevant documents such as the Global Air Navigation Plan (Doc 9750), the Asia/Pacific Region Seamless ANS Plan and the Manual on Collaborative Air Traffic Flow Management (Doc 9971), the objective of the Framework is to provide a regionally agreed framework for the harmonized implementation of networked, interoperable, multi-FIR, multi-State, cross- boundary collaborative ATFM capability

2.6. The Framework provides information, guidance and performance objectives including:

- ATFM principles;
- ATFM-related Aviation System Block Upgrades (ASBU);
- ATFM-related performance objectives / priorities of the Asia/Pacific Seamless ANS Plan;
- Distributed multi-nodal ATFM network concept;
- Collaborative decision-making (CDM);
- ATFM phases;
- Airspace and airport capacity improvement, planning, assessment and declaration;
- Airport Collaborative decision Making (A-CDM) and ATFM integration;
- ATFM daily plan;

- ATFM terminology, communications and information distribution;
- Meteorological information for ATFM;
- Training and competencies for ATFM personnel;
- Analysis of current ATFM capability in the Region
- A performance improvement plan with considerations to relevant performance objectives from the Asia/Pacific Seamless ANS Plan; and
- Considerations for research and future development.

Framework Update

2.7. The need for an update of the Regional Framework for Collaborative ATFM, was necessitated on account the following considerations:

- Alignment of the Regional ATFM Framework and Doc 9971 (3rd edition 2018);
- Global Air Navigation Plan 2019 update, including a major restructure of the ASBU framework;
- Asia/Pacific Seamless ATM Plan 2019 update;
- The new suite of basic phrases for Cross-Border GDP facilitation ;
- Development of ATFM Post Ops Analysis Framework;
- Introducing interoperability requirements between ATFM and A-CDM implementations in the APAC region;
- PfA to the Regional Framework – Origination of DLA Message ; and
- Rationalization of the document and its appendices, including the need to establish some large appendices as separate documents.

2.8. Taking into considerations of the above, this edition of Framework document has been reviewed and updated by the Air Traffic Flow management- Information Requirements- Small Working Group (ATFM/IR/SWG). The ATFM/IR/SWG consists of Subject matter Experts (SMEs) nominated by different APAC States and International Organizations (IO). The SWG held a series of virtual meetings and coordinated electronically to draft this edition.

EXECUTIVE SUMMARY

Development of Regional Framework for Collaborative ATFM

3.1 The Asia-Pacific (APAC) region is the world's largest market for air transport. Asia-Pacific countries jointly accounted for nearly 35 percent of the world's revenue passenger kilometres (RPK) in 2019, up from 24 percent in 2004, and six of the region's airports ranked among the world's 15 busiest airports by passenger throughput traffic compared to just two in 2004.

3.2 The coronavirus (COVID-19) pandemic has had a devastating impact on the aviation industry globally as nearly all air travel came to a halt in late March and April 2020. The impact in APAC region has been the most severe as virtually all scheduled international flights were suspended and several countries also implemented bans on domestic air travel in an attempt to contain the spread of COVID-19. In 2019, international travel within Asia represented 13.3 percent of global international travel, ranking it as second biggest market after the intra-Europe market. In 2021 Asia's share fell to 1.5 percent. Air Traffic in Asia-Pacific region is predicted to record the slowest improvement this year (2022), achieving only 62% of 2019 levels.

3.3 While recognizing that the first response to increased demand should always be an increase in capacity, the growing demand/capacity imbalance in the Region has resulted in increasing congestion, delays, costs and potential safety risks.

3.4 The need for a regional, network-based response to the challenges of increasing demand was recognized by APANPIRG/24 (June 2013) in its adoption of Conclusion 24/15: Asia/Pacific ATFM Steering Group, re-convening the ATFM/SG to develop a common Regional ATFM framework addressing ATFM implementation and ATFM operational issues in the Asia/Pacific Region. It was further recognized in the inclusion of the ASBU module B0-NOPS – Improved Flow Performance through Planning based on a Network- Wide View among the ten priorities and targets for the Asia/Pacific Region.

3.5 The scope of work of the ATFM/SG was further expanded by new terms-of-reference, endorsed by APANPIRG/25 (September 2014), which required the Steering Group to research and recommend appropriate ATFM guidance, and maintain an overview and review the effectiveness of Asia/Pacific CDM/ATFM programs.

3.6 The ATFM/SG developed the APAC Regional Air Traffic Flow Management Concept of Operation (ATFM CONOPS), version one, in 2015 and the Asia/Pacific Regional Framework for Collaborative ATFM in 2017.

3.7 With gathering pace of Airports Collaborative Decision Making (A-CDM) implementations across the APAC Region Airports, the Aerodrome Operations and Planning Group (AOPWG/4) recognized that benefits accrue by the implementation of Airport Collaborative decision Making (A-CDM) at high density aerodromes. States were facing implementation challenges which included lack of guidance materials and awareness, lack of coordination procedures, financial constraints and unavailability of IT supporting systems at the airports, training needs and lack of qualified human resources. Hence formation of a task force for development of guidance material was proposed.

3.8 APANPIRG/27 (September 2016) in Decision 27/2 approved the establishment of A-CDM Task Force (ACDM/TF). The Airport Collaborative Decision Making Task Force (ACDM/TF) was formed in 2017 . The ACDM Task Force objective was to assist States to overcome the challenges in A-CDM implementation.

3.9 The ACDM/TF focussed on reviewing the current status of A-CDM implementation in APAC Region, the effectiveness of existing A-CDM programmes in the APAC Region and the degree of harmonization with global guidance material. The TF analysed the ICAO Global A-CDM guidance in Doc 9971 to determine the need for and develop any necessary APAC Regional implementation guidance. The ACDM/TF developed APAC A–CDM Implementation Plan, in July 2021.

3.10 In the APAC region, the SWIM Task Force (SWIM TF) has been established since 2017 to develop SWIM-related components and supporting materials required for the implementation in the APAC region. The work of SWIM TF also includes the coordination with other Working Groups/Task Forces under APANPIRG to ensure that the operational requirements, particularly the ones specific to the region, are reflected and incorporated accordingly in the regional implementation strategies. SWIM TF/3 held in May 2019 agreed that the SWIM implementation to support cross-border ATFM operation should be given high priority.

3.11 In the 11th meeting of ATFM/SG it was noted that the Asia Pacific Airport Collaborative Decision Making Task Force (ACDM/TF) had achieved its objectives and accomplished the most of the tasks assigned under its Terms of Reference and hence it was recommended that Airport Collaborative Decision Making (ACDM) Task Force – ACDM/TF be dissolved and tasks of ACDM/TF be included in the tasks list of ATFM/SG . The decision was later approved by APANPIRG/32 in December 2021.

3.12 ATFM/SG/11 meeting proposed to undertake review of the APAC Regional Collaborative ATFM Framework document by the ATFM Information Requirements -Small Working Group (ATFM/IR/SWG). The ATFM/IR/SWG functions through subject matter experts (SMEs) nominated by States and International Organizations. The ATFM/SG/11 meeting also agreed upon the scope of the work on the amendment of the Framework. The current edition is the product of the review thus undertaken.

Distributed Multi-Nodal Network ATFM Concept

3.13 The ATFM/SG/11 meeting also stressed that amendments to the Framework must remain aligned with the APANPIRG-approved Asia/Pacific ATFM Concept of Operations.

3.14 The core concept of the Framework is the Distributed Multi-Nodal ATFM Network, i.e. a network of Air Navigation Service Providers (ANSPs) and/or Sub-Regional Groups leading independent ATFM operation within their area of responsibility and connecting to each other through information sharing framework. The ATFM operations in each node will be based on regionally agreed principles and high-level operating procedures.

3.15 The concept has been accepted into the Asia/Pacific Regional Framework for Collaborative ATFM as a viable solution for the region.

3.16 A description of the concept is provided in **APAC ATFM Concept of Operations Document at https://www.icao.int/APAC/Documents/edocs/Regional ATFM Concept of Operations.pdf.**

Interoperability is the Key

3.17 The Framework takes into account the ATFM development initiatives undertaken by various States to balance demand and capacity within their airspaces. Recognizing the need to adopt a network wide view for improving the flow performance across the APAC region, the Framework has been developed in line with ATM performance improvement elements of Asia Pacific Seamless ANS Plan.

3.18 A key consideration in the development of Version 3.0 of the Regional Framework for Collaborative ATFM was the interoperability of systems, procedures and practices to ensure not only regionally harmonized ATFM, but also the effective, complementary operation of other systems forming part of the gate-to-gate chain of air traffic management. It is vital that all systems and processes use common information, terminology and communications protocols to ensure common understanding and optimal outcomes. In particular, the interoperability of ATFM, Airport Collaborative Decision-Making (A-CDM), Arrival Manager (AMAN) and Departure Manager (DMAN) systems, and airspace user and ATM automation system interfaces, is critical to the success of a regional ATFM program and the optimized use of available capacity.

3.19 ATFM/SG addressed these issues in the development of harmonized ATFM terminology and the specification of automated system communications protocols, and through its linkage to the ICAO Asia/Pacific Region Aerodromes Operations and Planning Working Group (AOP/WG), Meteorological Sub-Group (MET SG) and APAC System Wide Information Management – Task Force (SWIM TF) .

3.20 In this edition, the interoperability requirements of ATFM and ACDM systems have been described.

ABBREVIATIONS AND ACRONYMS

AAR	Airport Arrival Rate
ADEP	Departure Airport
ADES	Destination Airport
ACDM	Airport Collaborative Decision Making
ATM	Air Traffic Management
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFP	Airspace Flow Program
AIDC	ATS Inter-facility Data Communications
AIGD	ICAO ADS-B Implementation and Guidance Document
AIM	Aeronautical Information Management
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AIXM	Aeronautical Information Exchange Model
AMAN	Arrival Manager
ANSP	Air Navigation Service Provider
AOM	Airspace Organization and Management
APAC	Asia/Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrade
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CDM	Collaborative Decision-Making
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CIBT	Calculated In Block Time
COM	Communication
CONOPS	Concept of Operations
COFT	Calculated Over Fix Time
CNS	Communications, Navigation, Surveillance
CPDLC	Controller Pilot Data-link Communications
CSP	Communication Service Provider
CTA	Control Area
CTR	Control Zone
CTOT	Calculated Take Off Time
COBT	Calculated Off_Block Time
CLDT	Calculated Landing Time
DGCA	Conference of Directors General of Civil Aviation
DMAN	Departure Manager
DME	Distance Measuring Equipment
DLA	Delay
EET	Estimated Elapsed Time
ETA	Estimated Time of Arrival
EST	Coordinate Estimate
FIR	Flight Information Region
FIRB	Flight Information Region Boundary
FMP	Flow Management Position
FOC	Flight Operations Centre
FUA	Flexible Use Airspace
GANP	Global Air Navigation Plan

GASP	Global Aviation Safety Plan
GBAS	Ground-based Augmentation System
GDP	Ground Delay Program
GSt	Ground Stop
GLS	GNSS Landing System
GNSS	Global Navigation Satellite System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IO	International Organizations
KPA	Key Performance Area
MIT	Miles-in-Trail
MINIT	Minutes-in-Trail
MET	Meteorological
METAR	Meteorological Aerodrome Report
MTF	Major Traffic Flow
OPMET	Operational Meteorological
PARS	Preferred Aerodrome/Airspace and Route Specifications
PASL	Preferred ATM Service Levels
PBN	Performance-based Navigation
PIA	Performance Improvement Areas
PKP	Passenger Kilometres Performed
RANP	Regional Air Navigation Plan
RPK	Revenue Passenger Kilometres
RNAV	Area Navigation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SAR	Search and Rescue
SBAS	Space Based Augmentation System
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
STAR	Standard Terminal Arrival Route or Standard Instrument Arrival (Doc 4444)
STCA	Short Term Conflict Alert
STS	Special Handling Status
SUA	Special Use Airspace
SUR	Surveillance
SWIM	System-Wide Information Management
TAF	Terminal Area Forecast
TBO	Trajectory Based Operations
TCAS	Traffic Collision Avoidance System
TMI	Traffic Management Initiative
TOC	Transfer of Control
UAS	Unmanned Aircraft Systems
UPR	User Preferred Routes
UTC	Coordinated Universal Time
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOLMET	Volume Meteorological
VOR	Very High Frequency Omni-directional Radio Range
VVIP	Very-Very Important Person
WAFC	World Area Forecast Centre

APAC REGIONAL COLLABORATIVE ATFM FRAMEWORK -PRINCIPLES, PROCEDURES AND PRACTICES

ATFM Principles

5.1 The major areas of Collaborative ATFM principles are mainly aligned with those of the Asia/Pacific Seamless ANS Plan (APSAP); People (human performance), Facilities (physical equipment), and Technology and Information. The APSAP describes 37 principles in respect of People, Facilities and Technology and Information covering the entire spectrum of ANS Services. The principles relevant to implementation of ATFM and ACDM are included **Appendix A**.

Aviation System Block Upgrades (ASBU)

5.2 At the Global level, ICAO started the ASBU initiative as a programme framework that developed a set of aviation system solutions or upgrades intended to exploit current aircraft equipage, establish a transition plan and enable global interoperability. ASBUs comprised a suite of modules organised into flexible and scalable building blocks, where each module represented a specific, well bounded improvement. The building blocks could be introduced and implemented in a State or a region depending on the need and level of readiness, while recognizing that not all the modules were required in all airspaces. ASBUs described a way to apply the concepts defined in the Doc 9854 with the goal of implementing regional performance improvements and were used in the new edition of the GANP to guide implementation.

5.3 ASBU are groups of operational improvements to advance air navigational capabilities and improve the performance of their air navigation system in a cost effect way. They are classified into three functional categories:

- Information;
- Operational; and
- CNS Technology and Services.

5.4 Within the ASBU framework in the Operational Category is the Module thread for Network Operations (NOPS), which aims to guide the development of air traffic flow management (ATFM) operation towards the envisaged end goal of shifting ATFM from trajectory management to airspace constraints management enabled by timely and precise information. The Global Air Navigation Plan (GANP-Ed.6,2019) also recognised Airport Collaborative Decision Making (A-CDM) as an important operational enabler for tactical flow management at airports and terminal airspace.

5.5 The 30th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/30, 2019) endorsed 16 Priority-1(ASBU Block 0 and 1 and Regional) Elements , as recommended in the Asia Pacific Seamless ANS Plan Version 3.0., as follows:

a) Aeronautical Meteorology: AMET-B0/1 – 4;

b) Aeronautical Information Management: DAIM-B1/1 – 6*;

c) Airport CDM: ACDM-B0/1 – 2;

d) ANSP human and simulator performance (Regional);

e) ATS Inter-facility Datalink Communications: FICE-B0/1;

f) Ballistic launches/space re-entry management (Regional);

g) Civil-Military Special Use Airspace (SUA) management (Regional);

h) Civil-Military strategic and tactical coordination (Regional);

i) Core data communications: VDL Mode O/A and AMHS COMI-B0/3, 7;

j) Direct and Free Route Operations: FRTO-B0/1 – 4;

k) Enhanced SAR systems (Regional);

l) Ground-based Surveillance: ASUR-B0/1 – 4;

m) Network Operations: NOPS-B0/1 – 5;

n) Performance-based Navigation Approach Procedures: APTA-B0/1 – 2;

o) Runway Sequencing: RSEQ-B0/1 – 2; and

p) Safety Nets SNET-B0/1 – 4

5.6 The Asia Pacific Seamless ANS Plan has recommended implementation of A-CDM-B0/1-2 and NOPS-B0/1 – 5 as Priority 1, i.e., which is considered as critical upgrade assignment essential to achieve the service level required regionally and globally.

5.7 The Version 3.0 of the Framework had considered Network Operations-NOPS-B0/1-5 modules for developing guidance material on Regional ATFM Framework implementation. This version of the Framework document, in addition, has considered Airport CDM (A-CDM)-B0/1-2 modules for inclusion in the guidance material for Regional ATFM implementation so as to ensure harmonized and interoperable system implementation across Airports and Airspace.

Asia/Pacific Region ATFM Operational Concept

5.8 The Regional ATFM Concept of Operations is based on the Distributed Multi-Nodal ATFM Network concept, which exists as a network of ANSPs leading independent ATFM operations within their area of responsibility, and connected to other ANSPs and stakeholders through effective information sharing with collaborative decision-making mechanism. The concept, adopted by ATFM/SG as the foundation for a Regional ATFM concept and implementation strategy, with the implementation date of 7 November 2019 in alignment with the Seamless ANS Plan.

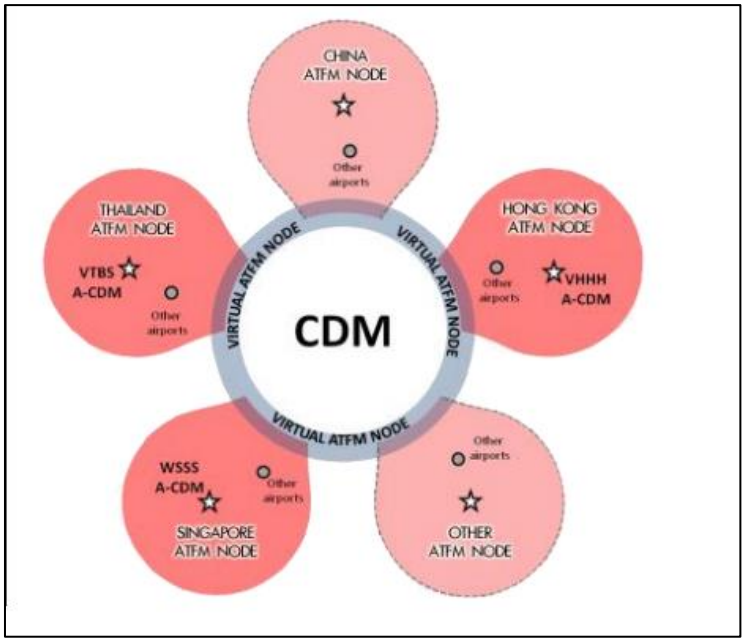


Figure 2: A Distributed Multi-Nodal ATFM Network

5.9 The concept recognizes that a centralized ATFM Unit (ATFMU) approach is not yet practicable for the Asia/Pacific region. At the centre of the concept is the distributed multi-nodal ATFM network, illustrated in Figure 2.

5.10 The Regional ATFM Concept of Operations document is available at https://www.icao.int/APAC/Documents/edocs/Regional ATFM Concept of Operations.pdf .

Collaborative Decision Making

5.11 ICAO Doc 9971 defines Collaborative Decision Making:

CDM is a process applied to support other activities such as demand/capacity balancing. CDM can be applied across the timeline of activities from strategic planning (e.g., infrastructure investments) to real-time operations. CDM is not an objective but a way to reach the performance objectives of the processes it supports. These performance objectives are expected to be agreed upon collaboratively. Since implementing CDM likely will require investments, these will need to be justified in accordance with the performance-based approach.

5.12 One key to the successful implementation of an effective ATFM service is achieving a robust coordination among aviation stakeholders. It is envisioned that ATFM is performed as a collaborative decision-making (CDM) process where aerodromes, ANSPs, airspace users (AUs) and other stakeholders work together to improve the overall performance of the ATM system. It is likewise envisioned that such coordination will take place within a flight information region (FIR), between FIRs and ultimately, between ICAO regions.

5.13 Key components and characteristics of the different ATFM/CDM concepts are shown below in Table 1:

Features	**Domestic ATFM**	**Regional ATFM**	**Regional ATFM Cross-Border Multi-Nodal**
Capability and Functionality	ANSP has an independent ATFM system.	Centralized ATFM organization for multiple ANSPs within a geographical region.	Each ANSP has an independent ATFM system which is connected in a distributed ATFM network sharing ATFM information.
	ANSP manages demand/capacity of its own airspace and airport(s).	Shared responsibility between each local FMU and central unit for management of demand/capacity of each ANSP's airspaces and airport(s).	ANSP independently manages demand/capacity of its own resources.
	Only domestic traffic is subject to ATFM measures.	Geographical region's flights subject to ATFM measures.	Flights participating in ATFM nodes within the region subject to ATFM measures.
Specify capacity and demand prediction	CDM is performed by stakeholders via software web interfaces or accepted messaging protocols.	Multi-level CDM processes and applications via web interfaces and accepted messaging protocols (legacy and SWIM messaging) applied in all	CDM is performed by stakeholders via software web interfaces or accepted messaging protocols.

		ATFM processes.	
	National procedures published by each State in the national regulations and AIP.	Common set of procedures for the geographical region's ATFM contained in the Regional Supplementary Procedures (Doc 7030) and common operations manual.	Individual procedures published by each ANSP, though normally coordinated and harmonized based on common operating procedures.
		Centralized compliance measurement and reporting.	
	Demand prediction – flight progress is via manual input or automated data feed (e.g., FDP, AMHS, or AFTN).	Demand prediction – centralized flight planning function ensures single and accurate demand picture throughout the region.	Demand prediction – flight progress is via manual input or automated data feed (e.g., FDP, AMHS or AFTN) to each node.
		ATFM measure assignments are automatically dispatched to all affected stakeholders and are visible via web interfaces and SWIM messaging.	
	Capacity management – inputs from FMP and FOC are via ATFM web-based interface.	Capacity management – inputs from FMP and FOC are via ATFM web-based interface. All constraints are reconciled to avoid conflicting measures.	Capacity management – inputs from FMP and FOC are via ATFM web-based interface. Conflicting ATFM measures must be manually resolved.
Evaluate Alternatives, Initiate/ Modify ATFM Measures	Aircraft operators perform CDM with airport operators for ground/surface delay intent.		
	ATFM slot assignments can be viewed via software, web interface and notifications.		

Table 1 : ATFM/CDM Concepts

5.14 Cross-border ATFM/CDM should provide opportunities for the efficient exchange of operational and strategic information for all stakeholders, ensuring strategic cooperation towards achieving the objectives of seamless ATM ANS and optimization of traffic flows across the region.

5.15 Regional ATFM in its basic principles, is no different from domestic ATFM: it relies on transparency, information exchange and collaboration. The difference arises from the number and variety of stakeholders. This generates additional complexity but yields a significant benefit as it allows providers from various States to collaborate and anticipate rather than be confronted with the consequences of ATFM measures implemented locally.

5.16 CDM partners and stakeholders should include:

- States, establishing regulations and overseeing safety and compliance;

- ANSPs, implementing ATFM capability;
- International Organizations such as ACI, CANSO, IATA and IFATCA;
- International ATFM Organizations (to share tactical flight data through ATFMU) – EUROCONTROL, FAA;
- Airport operators; and
- CDM-participating airlines.

5.17 Each State will develop ATFM capability according to its needs and requirements, and the overarching goal of seamless ATM across the Asia/Pacific Region.

5.18 The Regional concept for cross- border ATFM is based on a distributed multi-nodal ATFM network concept. Under this concept each State/Administration participating collaboratively in cross-border ATFM will form a node of the multi-nodal network and should be led by an agreed ANSP as the Node Leader.

5.19 Within an ATFM node there may be a number of airport operators, and airspace users and other stakeholders with a access to the node arranged by the Node Leader, facilitating their participation in the cross-border ATFM initiative.

5.20 The Node Leader should be responsible for engagement with the various Nodes stakeholders and ensuring the Node is ready and able to participate in the Regional Cross-b Border ATFM process. The processes within a node to enable this readiness may vary from node to node, and be applicable to the particular environment within the State(s). However, the readiness to engage with the regional cross- border multi- nodal system should be in accordance with the Regional Framework for Collaborative ATFM and its underlying distributed multi-nodal ATFM network concept, and any specific procedures identified and agreed by the multi-nodal participants. The Node Leader is responsible for ensuring compliance and therefore readiness to participate in the APAC cross-border multi-nodal ATFM initiative.

5.21 ANSPs and airspace users may participate in transition or trial participation leading to their full participation in the multi-nodal ATFM network. An example of tiered trial participation levels for ANSPs and airspace users is provided at **Appendix B**.

ATFM Phases

5.22 ICAO Doc 9971 describes a methodology to balance demand and capacity which can be accomplished through the application of an "ATFM planning and management". ATFM execution consists of three phases: strategic, pre-tactical, and tactical. These phases should not be considered as concrete steps, but rather as a continuous planning, action and review cycle that is fully integrated in the ATM planning and post-operations processes, three phases of ATFM execution; strategic, pre-tactical and tactical, illustrated in Figure 3.

5.23 The **Strategic ATFM phase** generally encompasses measures taken more than one week prior to the day of operation. Much of this work is accomplished two months or more in advance. This phase applies the outcomes of the ATM planning activities. It takes advantage of the increased dialogue between AUs and capacity providers, such as ANSPs and airports, in order to analyse airspace, airport and ATS restrictions, seasonal meteorological condition changes and significant meteorological phenomena. It also seeks to identify, as soon as possible, any discrepancies between demand and capacity in order to jointly define possible solutions which would have the least impact on traffic flows. These solutions are not set in stone and may be adjusted according to the demand foreseen in this phase.

5.24 The **Pre-Tactical ATFM phase** normally spans from one day to one week prior to operations. During this phase, the traffic demand for the day is analysed and compared to the predicted available capacity. The plan, developed during the strategic phase, is then adapted and adjusted accordingly. The main objective of the pre-tactical phase is to optimize capacity through an effective organization of resources (e.g., sector configuration management, use of alternate flight procedures).The work methodology is based on a CDM process established between the stakeholders (e.g., flow management unit (FMU), airspace managers, AUs

5.25 **Tactical ATFM solutions** and measures are adopted on the day of the operation. Traffic flows and capacities are managed in real time. The ADP is amended taking due account of any event likely to affect it. During this phase, any opportunity to mitigate disturbances should be used. The need to adjust the original ADP may result from staffing problems, significant meteorological phenomena, crises and special events, unexpected opportunities or limitations related to ground or air infrastructure, more precise flight plan data, the revision of capacity values, etc..

5.26 **Post-operations analysis is the final phase** in the ATFM planning and management process. During this phase, an analytical process is carried out to measure, investigate and report on operational processes and activities. This process is the cornerstone in developing best practices and/or lessons learned that will further improve the operational processes and activities. The process should also include an analysis of items such as anticipated and unanticipated events, ATFM measures and delays, the use of predefined scenarios, flight planning and airspace data issues.

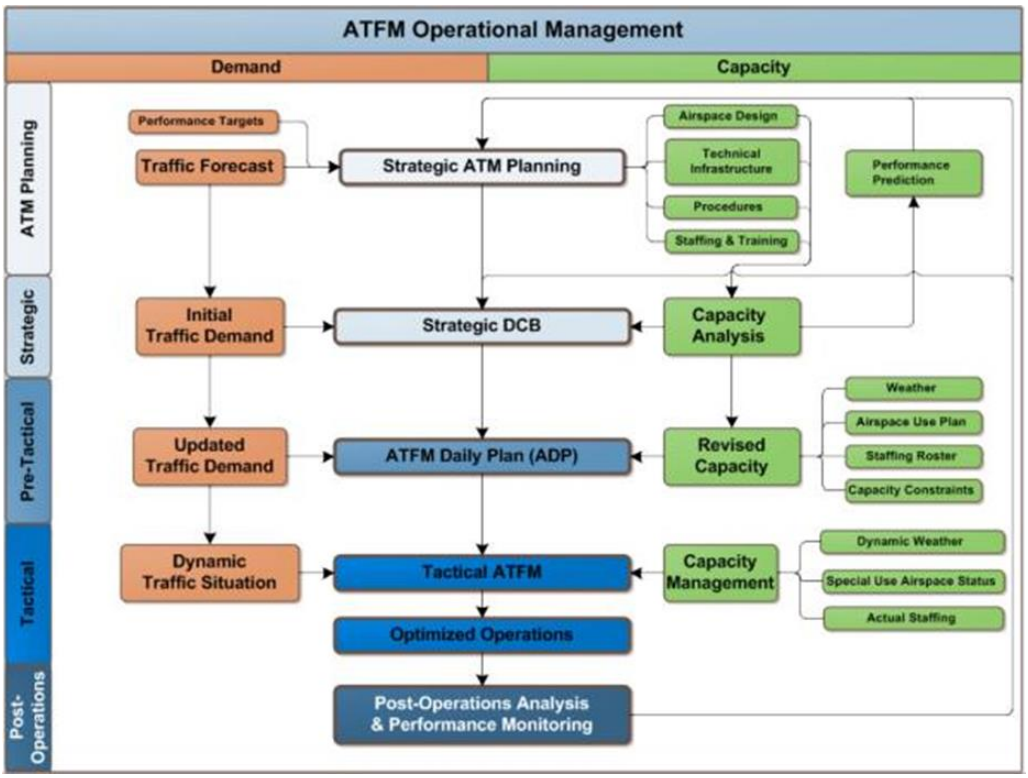


Figure 3: ATFM Operational Management

5.27 These phases of ATFM execution should not be considered as concrete steps, but rather as a continuous planning, action and review cycle that is fully integrated in the ATM planning and post-operations processes. The involvement of operational stakeholders in each phase is of utmost importance.

5.28 The timely application of measures in all three ATFM phases requires a fundamental

understanding of airport and airspace capacity, and the continuous assessment of capacity and the factors that impact upon it.

Capacity Planning, Assessment and Declaration

5.29 Annex 11 to the Convention on International Civil Aviation (Air Traffic Services) defines declared capacity as a measure of the ability of the ATC system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specified portion of airspace in a given period of time, taking due account of weather, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace.

5.30 The primary areas of capacity assessment and declaration for ATFM are Airport Arrival Rate (AAR), Airport Departure Rate (ADR), and airspace sector capacity. AAR and ADR are usually expressed in terms of movements per hour. Sector capacity may be expressed in terms of occupancy count and/or entry count.

5.31 ICAO Doc 9971 – Manual on Collaborative ATFM provides the following guidance on capacity planning and assessment:

- *Part II Chapter 3 and 4 – Capacity Determination and ATFM Phases and Solutions;*

- *Appendix II-B – Determining the Airport Arrival Rate – An example of a simplified methodology for determining the acceptance rate at an airport, based on scientific process developed by the Federal Aviation Administration (FAA).*

- *Appendix II-C – Determining Sector Capacity – An example of a simplified methodology for determining sector capacity at an area control centre (ACC), based on the process developed by the Federal Aviation Administration for establishing sector capacity.*

- *Appendix II-D – Capacity Planning and Assessment Process – Provides information developed by the European Organisation for the Safety of Air Navigation (EUROCONTROL) related to the ATFM capacity and planning assessment process.*

5.32 Detailed, high quality assessments of ATC sector capacity may also be conducted using fast-time simulations to analyse relevant data and the effects on capacity of proposed ATS changes or improvements. Data inputs include static infrastructure data, traffic data, ATC logic, procedures and task definition, and aircraft performance data.

5.33 Steps in a sector capacity assessment methodology utilizing fast-time simulations include:

i. Collect the necessary airspace and traffic data;
ii. Verify (with the support of local controllers) the traffic sample routes and the procedures used on a flow-by-flow basis;
iii. Correct, refine and insert the information into the model (done by the simulation experts). This includes the ATC procedures used in the sector, standard controller tasks, simulation parameters and aircraft performance parameters;
iv. Run an initial test-run of the model;
v. Verify flight profiles :The knowledge of local controllers can be used to adapt aircraft performance to local conditions, to define and verify sector specific controller tasks together with simulation parameters including conflict detection and resolution mechanisms;
vi. Consolidate a final model which is used to calculate results for all simulation scenarios, e.g. different sector configurations, different traffic samples, etc.;

vii. *Verify the simulation scenarios and the initial results, and if so required, do a fine-tuning of parameters.*

5.34 A fast-time simulation capacity assessment methodology should use a simulation engine that reproduces the ATC environment, and should follow a reiterative process of validation involving licensed ATC staff currently active on the sector/s under assessment. A fast-time simulation capacity assessment methodology should use a simulation engine that reproduces as truly as possible the ATC environment and should follow a reiterative process of validation involving licensed ATC staff currently active on the sector/s under assessment.

Airspace and Airport Capacity Improvement

5.35 Increased capacity is the primary and central method for managing increasing demand. Capacity increases may be achieved by improvements in infrastructure, airspace and ATS route design, procedures and stakeholder behaviours.

5.36 Airspace capacity improvements may be achieved by:

- Improved ATS route design including segregation of inbound, outbound and overflight traffic flows and, where supported by a business case, mandating of RNP specifications for ATS routes;
- Civil-military cooperation, including increased use of FUA to replace SUA;
- Improved ATC sectorization to more evenly apportion workload, including the capability for dynamic sector configuration;
- Segregation of SIDs and STARs in terminal areas to reduce ATC and pilot workload;
- ATM automation system enhancements including automated coordination and hand- off of aircraft between systems (AIDC) and sectors, and transition from paper flight progress-strips to automated, integrated electronic displays and flight plan interfaces;
- Implementation or extension of ATS surveillance services, and surveillance based separations specified in ICAO Doc 4444 (PANS-ATM);
- Implementation of RNP-based separations (RNP 4 or better) in non-surveillance airspace;

5.37 Airport capacity improvements may be achieved by:

- Improved airport design including additional runways, taxiways, parking stands and optimally positioned rapid-exit taxiways as per traffic mix and intensity;
- Harmonized AMAN, DMAN, A-CDM systems and ATFM systems;
- Analysis and improvement of runway occupancy times through enhancement of procedures and associated pilot practices;
- Implementation of precision approaches to all runways

5.38 The Seamless ANS Plan includes performance objectives aimed to improve airspace and airport capacity in the Asia/Pacific Region. The Performance Improvement Plan of this Framework includes capacity improvement objectives that are complementary to or expanding upon those of the Seamless Plan.

Demand Capacity Balancing (DCB)

5.39 Assessment of Capacity and Demand are integral part of ATFM process. The assessment

process is carried out in different time spans as described in ATFM Phases above. Increase of (airport, airspace) capacity to meet the forecast demand is the most preferred option. However, when most of the airports or airspaces are running at or near capacity, any capacity reducing event will create a demand-capacity imbalance. **Appendix C** provides a brief outlook on the DCB process and ATFM data requirements.

Airport Collaborative Decision Making (A-CDM)

5.40 Airport collaborative decision making is a process in which key stakeholders airport operators, airlines, other flight operators (e.g., general aviation), ground handlers, air navigation service providers (ANSPs)and air traffic flow managers - make joint operational decisions based on a shared set of operational data.

5.41 At its core, A-CDM is focused on enhancing the efficiency and utilization of airport, air traffic, and aircraft operator resources via collaborative and data-driven decision making. Often these decisions are associated with the real-time or near real-time sequencing of aircraft operations on the airfield in response to changing operational, environmental, or physical conditions at the airport or in the airspace near the airport.

5.42 In more advanced applications, A-CDM can also incorporate information regarding changing ATM network conditions—including airspace constraints in the enroute environment and conditions at other airports upstream and downstream from the airport of interest—and non-aeronautical constraints—including passenger processing or baggage handling constraints in airport terminals.

5.43 Regardless of the breadth of activities considered in a particular A-CDM implementation, the conceptual focus of the decision-making process is the same—determining how to equitably and efficiently sequence outbound (i.e., departing), inbound (i.e., arriving), and repositioning aircraft operations on the airfield to (1) reduce aircraft delays, (2) equitably distribute what delays cannot be eliminated, and (3) enhance the utilization of airport facilities, particularly aircraft parking stands.

5.44 Part III of Doc 9971 Manual on ATFM provides guidance on the implementation of A-CDM, It explains the basic concept of A-CDM, its benefits, basic elements such as variable taxi-time and coordination between ATFM and A-CDM systems. On the implementation of A-CDM, it explains how to engage with implementation partners, their roles, project, and manage the project, and highlights the importance of measuring the success of an A-CDM system with KPIs. Furthermore, in the form of appendices to it, Part III of Doc 9971 illustrates these concepts with practical examples such as an MOU template between A-CDM partners for cooperation, a template of generic AIP provided by Eurocontrol for States to implement A-CDM, a template MOU contributed by FAA of USA for data exchange, and a list of examples of KPI for the measurement of the effectiveness of A-CDM.

ATFM-ACDM Integration

5.45 Airport-CDM and ATFM systems should be integrated to facilitate collaboration, improve airport operations, especially for better capacity planning and operational performance at other airports. See chapter 8 of APAC A-CDM Implementation Plan for more information on integration between A-CDM and ATFM.

5.46 Airport-Collaborative Decision Making (A-CDM) and Air Traffic Flow Management (ATFM) are collaborative processes, with a common objective to optimize resources and improve efficiency in an airspace or airport. Through the integration of both systems, useful departure and arrival information could be exchanged to ensure that a common situational awareness is established for CDM stakeholders to enable effective decision-making.

Using the A-CDM milestones approach as a guideline for local ATFM-ACDM integration

5.47 The A-CDM milestones should be considered for the development and implementation of interoperability among A-CDM and ATFM systems. Each milestone could be a certain point in time or an operational event at the inbound, turn around or outbound phase of a flight. The definition and the associated actions of each milestone need to be defined and decided in accordance with local arrangements.

Formulation of baseline demand prediction for ATFM operations

5.48 The integration of ATFM and A-CDM Systems enables the sharing of schedule arrival and departure flight information from the A-CDM System to the ATFM System. The airport slot data in the ATFM System are automatically updated to obtain a reliable demand prediction. The data associated with flight intent that can be provided to ATFM services for use in demand predictions can be found in, Paragraph 5.4.4 on Data type description and harmonization Chapter 5 (ATFM service interfaces) of Doc 9971.

Information used to provide A-CDM in ATFM systems

5.49 The information that could be used to provide A-CDM in ATFM systems can be found in Doc 9971, Chapter 3, A-CDM methods and tools, Para 3.5.2, Groups/types of information. The figure 3 below provides the overview of the various information in A-CDM application.

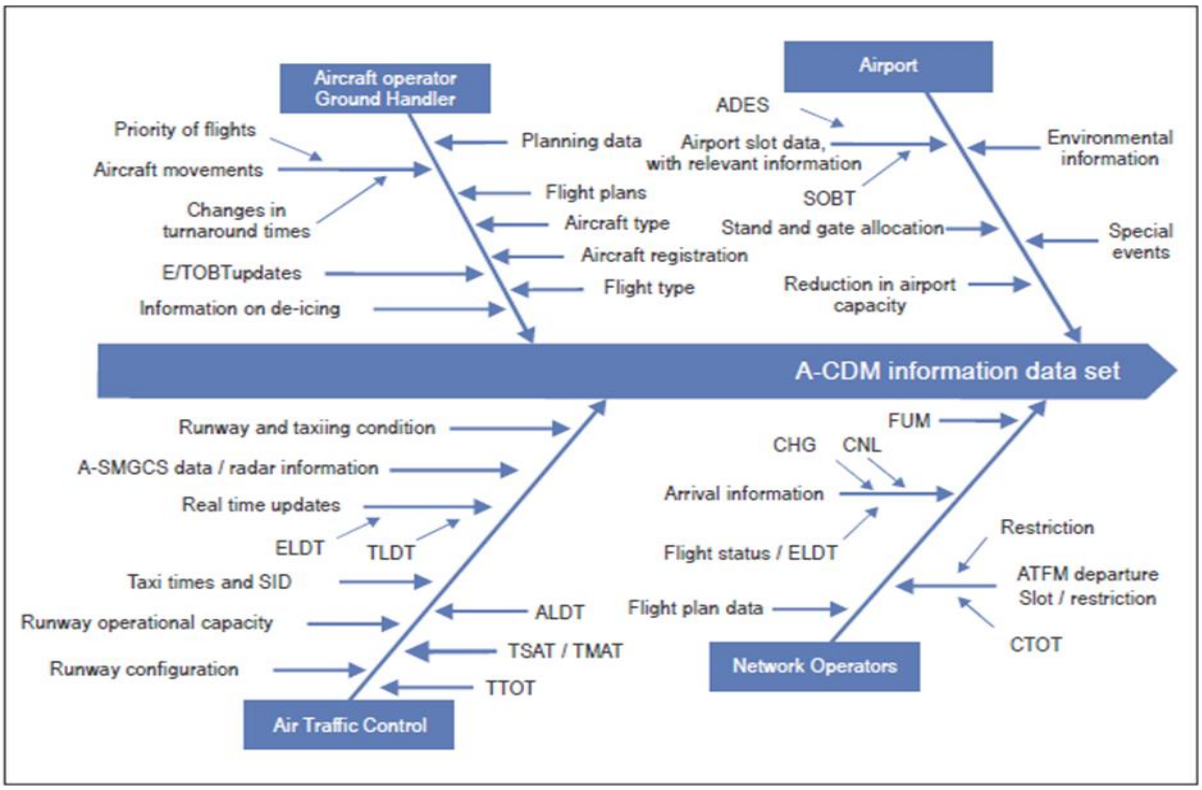


Figure 4: A-CDM Information data set

Sharing arrival information between ATFM and A-CDM Systems

5.50 The purpose of A-CDM during the inbound phase is to enhance the distribution and use of advance arrival information to/by stakeholders when the flight is inbound to the CDM airport. Flight Update Messages (FUM), or equivalent, are sent to the A-CDM System from the ATFM System to update on the progress of a flight. The details on the distribution of information can be found in Doc

9971, Chapter 3 on A-CDM methods and tools; and Para 3.4.4 on the inbound phase.

Sharing departure information between ATFM and A-CDM Systems

5.51 The purpose of A-CDM for the outbound phase is to optimize planning of the departing flights. The details on the distribution of information can be found in Doc 9971, Chapter 3, A-CDM methods and tools; and Para 3.4.6, Departure- outbound phase.

Sharing ATFM Measure Information

5.52 ATFM Measures (CTOTs) affect departing flights from A-CDM Airport. Exchanging this information timely through integration between ATFM and A-CDM would enable pre-departure sequencer to generate TSATs accordingly. By sharing this information, stakeholders can have increased awareness about departure flow and restrictions.

ATFM Daily Plan

5.53 ICAO Doc 9971 – Manual on Collaborative ATFM states that the organization and structure of the CDM process depends on the complexity of the ATFM system in place, and must be structured to ensure that the affected stakeholders, service providers and airspace users can discuss airport and airspace capacity and demand issues through regular meeting sessions and formulate plans that aim to optimize the efficiency of the ATM system while balancing demand and capacity by taking all pertinent aspects and points of view into account.

5.54 Frequent tactical briefings and conferences can be used to provide an overview of the current ATM situation, discuss any issues, and provide an outlook on operations for the coming period. They should occur at least daily but may also be scheduled more frequently depending on the traffic demand and capacity situation (e.g. an evolving meteorological event may require that the briefing frequency be increased). Participants should include involved ATFM and ATS units, airspace user representatives, affected military authorities and airport authorities, as applicable.

5.55 The output of these daily conferences should be the publication of an ATFM daily plan (ADP) and should include subsequent updates. The ADP should include a proposed set of ATFM solutions (e.g. activation of routing scenarios, miles-in-trail (MIT), or ground delay program (GDP)) prepared by the ATFM unit and agreed upon by all partners concerned during the planning phase. The ADP should evolve throughout the day and be periodically updated and re-published as required.

5.56 In addition to the daily conferences, the ATFM unit should consider holding periodic and event-specific CDM conferences, with an agenda based on experience. The objective should be to ensure that the chosen ATFM measures are decided through a CDM process and agreed to by all affected stakeholders.

5.57 It is recommended that an ADP cover a 24-hour period, and may, however, cover a shorter period of time, provided that appropriate mechanisms are in place to update the plan on a regular basis. An ADP should include at minimum, the following items of information :

i. Aerodrome or Airspace Sector identification;

ii. Declared Capacity or Operational Capacity (airport and/or airspace sector capacity);

iii. Description of constraints;

iv. Time frame

v. Proposed ATFM measures; and

vi. Remarks/other relevant information

A template for the ATFM daily plan is provided at **Appendix D**.

5.58 To facilitate network-wide situational awareness in the Asia/Pacific region, and to ensure ADPs can be distributed and processed by regional stakeholders, the ADP exchange procedure has been developed. States/Administrations wishing to share ADPs should follow the procedure outlined in the Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure (working draft) accessible at ICAO Asia/Pacific Regional Office's eDocument webpage - https://www.icao.int/APAC/Pages/eDocs.aspx

5.59 An important component of the CDM process is post-operations analysis, including consideration of feedback from airspace users, airports operators, ATS and other ATFM units. The feedback can be used for the continuous improvement of pre-tactical and tactical planning. It can help identify the reason(s) for ATFM solutions and corrective actions that can be used to avoid reoccurrence and to improve upon the implemented solutions. It is recommended, therefore, that post-operations analysis result of the previous day's operations, if applicable, be shared during the daily teleconferences. Supplementary conferences focusing on assessing the outcomes of specific ATFM solutions can also be called when the ATFM programs are activated in response to abnormal situations.

Advance Notification of ATFM

5.60 Timely dissemination of ATFM information is critical to successful ATFM operations. Whenever possible, ATFM units should provide notice of ATFM measure activation as far in advance as is practicable, considering the balance between providing enough lead time for stakeholders to prepare for the measures and the accuracy of demand-capacity information available for advanced decision-making. ATFM measures activated "with immediate effect", especially ones with significant delay impacts, tend to have many repercussions and create challenges for stakeholders especially airborne aircraft and upstream ATS units. It is advisable, therefore, that ATFM units avoid such short-notice activation as much as practicable, and to open channels for CDM process to properly address the repercussions and challenges faced by stakeholders when these are activated.

5.61 Different ATFM measures require different lead time to activate, and ICAO Doc 9971 provides some guidance on choosing the appropriate ATFM measure given the lead time available. Post-operations analysis, with a focus on stakeholders' ability to comply with the ATFM measures, can be useful in determining whether the lead time provided is enough for stakeholders to respond to the requirements and should therefore be tracked and used to adjust the procedures.

ATFM Coordination Phrases and Terminology

5.62 Recognizing the lack of a current, globally standardized ATFM terminology, ATFM/SG considered the terminologies used by States and organizations advanced in ATFM implementation, both within and external to the Asia/Pacific Region.

5.63 The global development of ATFM has largely been undertaken in isolation by individual ANSPs, EUROCONTROL, ICAO Sub-Regions or other informal groups of States, or by ATFM system vendors. This has resulted in differences in concept development and consequently the technical terms used for operational and technical coordination of ATFM information.

5.64 ATFM/SG developed a set of standardized ATFM terminology for the Asia/Pacific Region to promote harmonization and interoperability of CDM/ATFM systems and procedures. The terminology set is referenced from ICAO Manual on Collaborative ATFM (Doc 9971, 3rd Ed.), adjusted to be appropriate for Asia/Pacific regional use.

5.65 The Asia/Pacific Region ATFM terminology for use in ATFM communications is

provided at **Appendix E**.

5.66 In addition, the ATFM/SG also considered the need for a harmonized set of plain-language phrases for ATFM coordination between ATFM units, ATS units, and airspace users, especially as cross-border ATFM coordination generally occurs in plain-language English and many Asia/Pacific States and organizations do not have English as their official/first language. The harmonized set of coordination phrases helps form the starting basis for operational staff to communicate with one another in a cross-border ATFM environment with low risk of miscommunication. The Basic Phrases for Cross-Border ATFM Coordination (working draft) is provided in the ICAO Asia/Pacific Regional Office's eDocument webpage.

Note: The Basic Phrases are for use as an interim procedure, pending development of globally standardized ATFM-related phraseology

ATFM System Communications

5.67 Regional and Global interoperability of communications is critical to the implementation of effective, network-based cross-border ATFM.

5.68 Flight Information Exchange Model (FIXM) is one of the standardized information exchange models developed to enable the global interoperability for the ATM community. Particularly, it is to support the seamless exchange of flight-specific information among ATM stakeholders throughout a flight's lifecycle. FIXM is an equivalent to Aeronautical Information Exchange Model (AIXM) and ICAO Meteorological Information Exchange Model (IWXXM), both of which are developed to provide global standards for the sharing of aeronautical information and meteorological information, respectively.

Figure 5 illustrates the data-level interoperability among stakeholders achieved by FIXM

Figure 5: FIXM Interoperability among Stakeholders

5.69 FIXM is referenced in the FICE ASBU thread of Global Air Navigation Plan, especially in Block 2 and Block 3 timeframes:

- *FICE-B2*
  - *Introduce the FF-ICE Release 1, pre-departure trajectory coordination and synchronization;*

- *Provide mechanisms for collaborative flight information management, which is a basis for initial TBO, through the exchange of flight intent in FIXM format;*
- *Enable the improved capacity utilization based on timely and accurate flight information shared among ATM stakeholders.*

- *FICE B3*
  - *Introduce mechanisms to support the post-departure trajectory coordination and synchronization;*
  - *Enable trajectory management integrated with tactical ATC operations through capabilities to manage trajectory when there are dynamic resource, e.g. airspace, constraints.*

5.70 In November 2019, the FIXM version 4.1 Extension was adopted by APANPIRG/30 to be the Asia/Pacific FIXM version 4.1 Extension for use by Asia/Pacific States/Administrations to support the cross-border ATFM information exchange. With the release of FIXM version 4.2 in February 2021, the Asia/Pacific FIXM version 4.1 Extension have been updated to version 4.2. FIXM version 4.2 (or later), extended where necessary, to accommodate additional regional requirements, is therefore the agreed ATFM information exchange model for exchanging ATFM data between ATFM systems in the Asia/Pacific Region.

5.71 More information on FIXM is available at www.fixm.aero

ATFM Information Distribution

5.72 ATFM Daily Plans and ATFM Measures for individual aircraft may be distributed between ATFM units, ATS units, airport operators, and airspace users by the following means:

- Networked, web-based interface at ATFMU, ATSU and airspace user locations, each forming a node of a distributed multi-nodal ATFM platform; or
- Web-based interface at ATFMU, ATSU and airspace user locations, providing access directly to ATFM information provided by the ATFMU responsible for the initiation of ATFM measures for the destination airport or constrained airspace; or
- SWIM-based technologies to support the exchange of both flight-specific and non-flight-specific information (depending on the exchange model development progress); or
- AFTN/AMHS messages distributed to individual ATSUs and Airspace Users; or
- Email distribution; or
- Voice Coordination

5.73 Considering the scope and performance objectives of this Framework, and the stage of development of the Distributed Multi-Nodal ATFM Network concept, Table 2 outlines the minimum items of ATFM information that ATFM systems should be able to obtain, process, and – for some of the data elements – share with stakeholders.

Flight Event Times					
Applicability	**Flight Plan**	**System Estimated**	**Calculated (ATFM Measure)**	**Targeted (A-CDM)**	**Actual**
Departure Terminal Gate	EOBT			TOBT	AOBT

(Airline Intention)					
Departure Terminal Gate (ATC Sequencing)				TSAT*	
Departure Runway		ETOT	CTOT*	TTOT	ATOT
RFIX or AFIX		ETO	CTO*		ATO
Arrival Runway		ELDT	CLDT*		ALDT
Arrival Terminal Gate					AIBT
Other Information					
ATFM Daily Plan (ADP)*					

***Note: Items marked with an asterisk (*) are items that should be shared with stakeholders.**

Table 2: Minimum ATFM Information for Distribution and Sharing

ATFM Communications by AFS

5.74 Recognizing that States' needs for ATFM may vary, where necessary ATSUs may participate in collaborative ATFM without having the need for dedicated ATFM systems or terminals. The Aeronautical Fixed Service (AFS) may provide a suitable method for distribution of ATFM measure information to such ATSUs.

5.75 Given that the main ATFM measure used in Asia/Pacific under the Distributed Multi-Nodal ATFM Network concept is the Ground Delay Program (GDP), the ability to exchange Calculated Take-Off Times (CTOTs) and other associated data elements in machine-readable formats over AFS (AFTN/AMHS) between not only ATFM systems but also ATM automation is critical. The ATFM/SG therefore studied the best practices from other regions on the topic, with particular attention paid to the EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP) which governs the AFS-based exchanges of ATFM slot-related messages within the European ATFM network.

5.76 The study culminated in the development of Asia/Pacific AFTN/AMHS-Based Interface Control Document for Air Traffic Flow Management, a document outlining the various AFTN/AMHS message formats to be used for information exchange during a Ground Delay Program.

5.77 In the interim before the implementation of System-Wide Information Management (SWIM) in the region, the AFTN/AMHS-Based ICD discussed above is the agreed format for ATFM message exchange in Asia/Pacific. The ICD can be found on the ICAO Asia/Pacific Regional Office's eDocument webpage.

Meteorological Information for ATFM

5.78 Where the capability exists, it is recommended that the ANSP collaborates with the State's dedicated meteorological services provider as well as meteorologists of major airspace users, to determine the projected meteorological impact on the available capacity. The upfront involvement of airspace users ensures transparency of the capacity planning process, and then forms the first step of CDM. This level of transparency can greatly assist the effectiveness of downstream CDM in the operational realm, as early involvement in developing the operational plan results in less blaming between stakeholders and more constructive dialogue

5.79 The accuracy of pre-tactical and tactical demand and capacity assessment is reliant on the

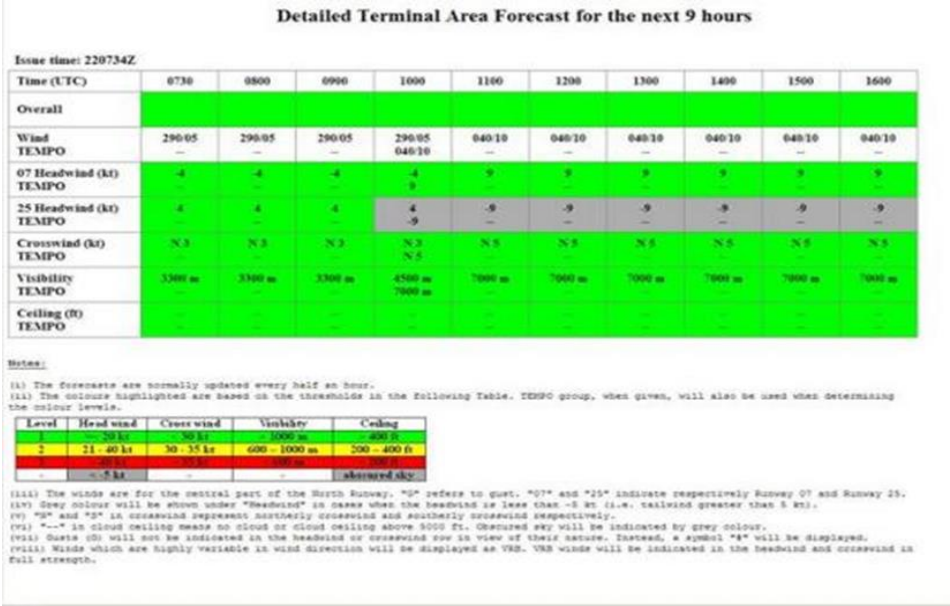
predictability of events that will impact capacity. In the case of weather-related constraints, the traditional Annex 3 services in support of aerodrome operations and FIR/Global operations do not fully address the needs of ATFM. While globally, MET authorities are working steadily towards the institutional provision of Meteorological Services to support the Terminal Area (MSTA), there is a greater urgency for ATFM providers to collaborate closely with Met service providers to develop products that bridge the gap between the traditional information.

5.80 The provision of timely, accurate and targeted meteorological information is an important factor in making decisions for the determination of capacity at an aerodrome and/or airspace. Whilst the weather forecasts and advisory services are expected to be accurate, timely and relevant, there are still uncertainties primarily due to the chaotic nature of the atmosphere. It is also inevitable that uncertainties would grow with forecast time. It is important to factor these in when making ATFM decisions. For determining an effective ATFM measure, in addition to the timing and the severity of a particular weather phenomenon, the probability of the occurrence is also essential to assist in capacity assessment.

5.81 When predicting the capacity of an airport with regard to forecast meteorological conditions, it is important to not only consider the runway/s and immediate airport surroundings, which are covered by the Aerodrome Forecast (TAF) to a distance of 8km, but to also take into consideration the ability for air traffic to flow via the terminal area on the normal arrival routes and instrument approach procedures to that airport. In particular, weather affecting the airspace in the vicinity of the primary holding areas and initial approach fixes can have a significant impact on the delivery of flights into the approach airspace and onto the runway.

5.82 The current Annex 3 provisions do not include provisions for meteorological information that specifically support the determination of weather impact on capacity. OPMET information is typically pilot and/or tactical ATC oriented, with limited ATFM orientation. , and are largely produced in coded text format, which makes rapid interpretation difficult for ATM officers.

5.83 ICAO Annex 3 requires that each Contracting Sate shall determine the meteorological service which it will provide to meet the needs of international air navigation, and that this shall consist of the provision of meteorological information to users that is necessary for the performance of their respective functions. Therefore, to enable rational and quantifiable capacity determination, ANSPs and Meteorological service authorities should collaborate closely to define meteorological services to be provided to support ATM and ATFM decisions, based on specific impact to operations. Such targeted MET information should address key thresholds for various weather criteria which have a quantifiable impact on airport and terminal airspace capacity, such as headwind, crosswind, visibility, ceiling, wind shear, and convective weather at the initial approach fix (IAF) or in the vicinity of critical arrival fixes, holding points and sequencing areas. An example of the simple type of matrix that could be produced, with intuitive colour coding for quick recognition by ATM staff, is shown in Figure 6. In terms of the wider Terminal area, similar defined criteria, thresholds and colour coding can enable rapid interpretation of impact on operations.



Detailed Terminal Area Forecast for the next 9 hours

Issue time: 220734Z

Time (UTC)	0730	0800	0900	1000	1100	1200	1300	1400	1500	1600
Overall										
Wind TEMPO	290/05	290/05	290/05	290/05 040/10	040/10	040/10	040/10	040/10	040/10	040/10
07 Headwind (kt) TEMPO	-4	-4	-4	-4 3	5	5	5	5	5	5
25 Headwind (kt) TEMPO	-4	-4	-4	-4 -9	-9	-9	-9	-9	-9	-9
Crosswind (kt) TEMPO	N3	N3	N3	N3 N5	N5	N5	N5	N5	N5	N5
Visibility TEMPO	3300 m	3300 m	3300 m	4500 m 7000 m	7000 m	7000 m	7000 m	7000 m	7000 m	7000 m
Ceiling (ft) TEMPO										

Notes:

(i) The forecasts are normally updated every half an hour.
(ii) The colours highlighted are based on the thresholds in the following Table. TEMPO group, when given, will also be used when determining the colour levels.

Level	Head wind	Cross wind	Visibility	Ceiling
1	[illegible] 20 kt	30 kt	> 3000 m	> 400 ft
2	21 - 40 kt	30 - 35 kt	600 - 1000 m	200 - 400 ft
3	[illegible]	[illegible]	< 600 m	< 200 ft
-	> 5 kt	-	-	observed sky

(iii) The winds are for the central part of the North Runway. "0" refers to gust. "07" and "25" indicate respectively Runway 07 and Runway 25.
(iv) Grey colour will be shown under "Headwind" in cases when the headwind is less than -5 kt (i.e. tailwind greater than 5 kt).
(v) "N" and "S" in crosswind represent northerly crosswind and southerly crosswind respectively.
(vi) "---" in cloud ceiling means no cloud or cloud ceiling above 5000 ft. Obscured sky will be indicated by grey colour.
(vii) Gusts (G) will not be indicated in the headwind or crosswind row in view of their nature. Instead, a symbol "#" will be displayed.
(viii) Winds which are highly variable in wind direction will be displayed as VRB. VRB winds will be indicated in the headwind and crosswind in full strength.

Figure 6: Example Colour-Coded Matrix of Met Information

5.84 An example of IAF and holding stack prediction based on weather intensity and coverage area is shown in Figure 7, using similarly defined criteria and thresholds to facilitate rapid interpretation of the impact on operations.

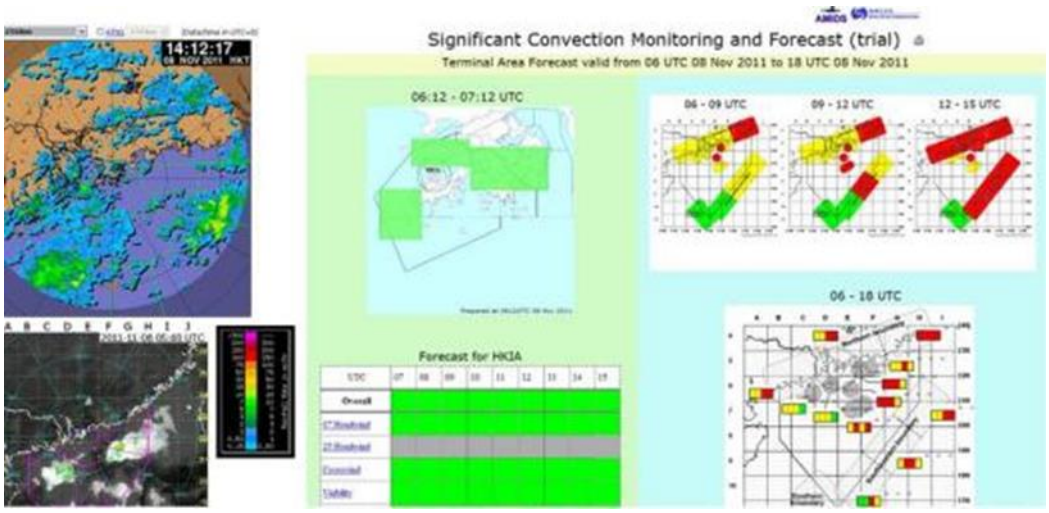


Figure 7: IAF and Holding Stack Weather Prediction

5.85 When identifying criteria to be used in determining MET services, consideration should be given to thresholds for meteorological elements that result in a change of runway operating mode, such as:

- a change of runway dependency;
- a change of spacing between arriving aircraft;
- a change in nominal aircraft approach speeds;
- an exceedance of aircraft operating limitations for significant numbers of aircraft (eg maximum crosswind component);

- an inability to commence an approach via the IAF; or
- an inability to hold in the primary published holding areas, etc.

5.86 When considering the lead time requirements for such forecast products, it is necessary to strike a balance between the desired probability and accuracy and the target ATFM aircraft population.

5.87 Given the direction towards Regional ATFM through ground delay programs, it is therefore desirable that the forecast period cover at least 6-8 hours ahead to encompass the majority of regional length flights with notification of ATFM measures an acceptable time before estimated off blocks time (EOBT).

5.88 In accordance with Annex 3 requirements, including the requirement that close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological services for international air navigation, States should ensure that the MET service provides sufficient detail and accuracy.

5.89 ICAO APAC Meteorological Requirements Working Group (MET/R WG) has developed specific regional guidance material necessary to assist States in developing and implementing tailored meteorological information and services to support effective ATM. The guidance captures most of the necessary processes from preparatory to operational phases. Furthermore, it provides detailed operational services, with specific examples and an operational scenario on ATM-tailored MET information and services. The *APAC- Regional Guidance for Tailored MET Information to Support ATM* is available at ICAO eDocuments website.

5.90 Joint post-operational analysis could be conducted between service provider (MET) and user (ATM) so as to enhance the effectiveness and reliability of MET information and services for supporting ATM operations. By collecting necessary operation logs and feedback from stakeholders on a daily basis, post-operational analysis can be conducted on a regular basis or as required for identifying room for improvement of MET information and services. Results of post-operational analysis are summarized as reports and reviewed in the meeting between MET and ATM so that a recommended practices can be integrated into the ATFM framework for daily operations.

Training, Competencies, and Qualification for ATFM Personnel

5.91 An ATFM service must be staffed by personnel with sufficient knowledge and understanding of the ATM system they are supporting and the potential effects of their work on the safety and efficiency of air navigation. To ensure this and within the framework of their training policy, States and ANSPs should establish training plans to ensure that ATFM service staff are properly trained.

5.92 ICAO Doc 9971, ICAO Manual on Collaborative Air Traffic Flow Management, recognizes the requirement for training all stakeholders in an ATFM service, i.e. those directly operation and ATFM function and all other ATFM stakeholders including airspace users and ATS personnel.

5.93 The APAC ATFM Training Guide is available on ICAO edocuments website.

5.94 To ensure an ATFM service is provided by personnel with sufficient competencies, States and ANSPs should consider establishing national ATFM service personnel qualification program that is appropriate to the local environment and the level of ATFM service to be provided. The qualification scheme established by States and/or ANSPs should include provisions for:

- Appropriate recruitment of candidates with requisite ATS/ATM background,
- Methodical training program, with varying methods of instructions to ensure effective

achievement of desired competencies,

- Assessment program to evaluate candidates' competencies to function as ATFM personnel,
- Regular refresher/recurrent training to ensure up-to-date knowledge among the personnel,
- Recency of experience evaluation to be used before a return-to-service when a personnel has been absent from the function for an extended period, and
- (any other provisions appropriate to the local requirements)

5.95 Considering that ATFM is not a directly safety-critical service, albeit still a service that contributes to the planning of safety of air traffic services, the ATFM personnel qualification scheme may not need to be as rigorous as that of the air traffic service personnel licensing (e.g., air traffic controller licensing). It should, however, be at the appropriate level of rigor to ensure ATFM personnel are able to interface with each other, with ATS personnel, and with stakeholders effectively and professionally.

5.96 Considering also that ATFM operations in Asia/Pacific is largely cross-border in nature and ATFM personnel will be required to coordinate with international counterparts, States and ANSPs should also consider including appropriate level of English language proficiency into the ATFM qualification scheme.

5.97 Any qualification scheme established should be in line with the provisions in ICAO Annex 1 – Personnel Licensing

Regional ATFM Implementation Guidance

5.98 Under Phase II of the IATA Regional Air Traffic Flow Management Project, as agreed by ATFM/SG/4, IATA delivered the Regional ATFM Implementation Guidance document for consideration by ATFM/SG/6 (Bangkok, Thailand, June 2016). The guidance was included as an Appendix in version 3.0 of the Framework document as it was important to provide harmonized implementation guidance to assist States in the planning and execution of ATFM implementation projects, and to the future interoperability of State and Regional ATFM programs.

5.99 Subsequently Doc 9971, Manual on Collaborative ATFM , 3rd Edition published in 2018 further amplified the guidance document and included a comprehensive guidance on ATFM implementation in Chapter 8 of Part II. It includes information and guidance on:

- ATFM Implementation Steps;
- Operational Implementation;
- Implementation Risks and Mitigation;
- Post-implementation activities;
- Regulatory requirements; and
- Assessment of benefits.

5.100 The above guidance should, in conjunction with this document and the Asia/Pacific Regional ATFM Concept of Operations, be examined by all APAC Region States planning ATFM implementation.

Regional ATFM Implementation Monitoring

5.101 The Regional Framework for Collaborative Air Traffic Flow Management is one of several important plans that are subsidiary to the Seamless ANS Plan, namely:

- Asia/Pacific Search and Rescue (SAR) Plan;
- Asia/Pacific Region ATM Contingency Plan; and
- Asia/Pacific Regional Framework for Collaborative ATFM; and
- Asia/Pacific Collaborative Aeronautical Information Management (AIM) Plan ; and
- Asia/Pacific A-CDM Implementation Plan.

5.102 States report implementation of the performance expectations of the Seamless ANS Plan using an online reporting form. Monitoring and reporting schemes for subsidiary plans enhance the current Seamless ANS monitoring and reporting scheme.

5.103 A common reporting date of 28 February is proposed for implementation status reports provided against regional plans including the Regional Framework for Collaborative ATFM, Regional Plan for Collaborative AIM, Regional SAR Plan and Regional ATM Contingency Plan. This would ensure that the reported data is received sufficiently early to facilitate implementation reporting to the relevant technical group while allowing flexibility in the scheduling of technical meetings.

5.104 In addition, it is also proposed to standardise the reporting format of the forms to percentages for example: 20%, 50%, 72%, etc… for consistency and clarity (Appendix F).

5.105 The monitoring and reporting scheme for Regional collaborative ATFM implementation measures State implementation of the performance expectations specified in Section 7 of this document.

5.106 Asia/Pacific Administrations should report their implementation status to the ICAO Asia/Pacific Regional Office at least once annually, **by no later than 28th February each year**. Reported implementation status will be examined each year by the ATFM/SG, or other appropriate Regional body designated by APANPIRG, to measure, report and advance Regional implementation progress, and to recommend priority ATFM elements to be added to the Seamless ANS monitoring and reporting scheme.

5.107 It is expected that the relevant ATFM expert/s in each Administration will be responsible for the detailed reporting in the Regional ATFM Monitoring and Reporting form, and that these experts will then liaise closely with their Administration's Seamless ANS reporting point of contact to ensure the accuracy of the higher level reporting and consistency between the separate reporting levels.

5.108 The Regional ATFM Monitoring and Reporting Form is provided at **Appendix F**, and is available on the ICAO Asia/Pacific Regional Office eDocuments web-page at http://www.icao.int/APAC/Pages/edocs.aspx.

APAC REGIONAL ATFM IMPLEMENTATION – CURRENT STATUS

Background

6.1 The Fifth Meeting of the Air Traffic Management Sub-Group of APANPIRG (ATM/SG/5, Bangkok, Thailand, 31 July to 04 August 2017), agreed to the use of a Regional ATFM Monitoring and Reporting Form that would be used to analyse ATFM implementation against the performance objectives of the Regional Framework for Collaborative ATFM with the following Conclusion:

> ***Conclusion ATM/SG/5-3****: Asia/Pacific Regional Framework for Collaborative ATFM Amendment*
>
> *That,*
>
> *1 the Regional Framework for Collaborative ATFM be amended to include the information and performance objectives in Appendix D to the Report; and*
>
> *2. the ATFM Implementation Status Report form provided in Appendix E to the Report be included in the Regional Framework for Collaborative ATFM as an appendix and made available on the ICAO Asia/Pacific Regional Office website; and*
>
> *3. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 30 April each year, using the ATFM Implementation Status Report Form.*

6.2 The Regional ATFM Monitoring and Reporting Form is provided at Appendix F, and is available on the ICAO Asia/Pacific Regional Office eDocuments web-page at http://www.icao.int/APAC/Pages/edocs.aspx.

6.3 States report implementation of the performance expectations of the Regional Collaborative ATFM Framework using the above reporting form.

6.4 The reporting form provides evidence of implementation of ATFM, which States are obliged to implement in accordance with the standards of Annex 11. Non-reporting will be treated in the same way as non-implementation for the purpose of ICAO reporting to ATM/SG and APANPIRG.

6.5 The ATFM Implementation Status Report form provides for two tiers of status reporting:

> ***A****: Administrations that are expected, or intend, to implement and distribute cross-border ATFM measures under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM; and*
>
> ***B:*** *Administrations that are not expected to implement and distribute cross-border ATFM measures as described in A.*
>
> *Note: Administrations that are not expected to implement and distribute cross-border ATFM measures are expected to implement a number of other elements of the Regional Framework for Collaborative ATFM in order to support regional cross-border ATFM..*

6.6 Administrations reporting against Tier B implementation should note the Regional Framework for Collaborative ATFM and Asia/Pacific Seamless ATM Plan elements referring to *ATFM Program Airports, High Density Airports and High-Density FIRs,* and commence reporting against Tier A elements where any of their aerodromes or FIRs met these criteria.

6.7 In alignment with the methodology applied to assessment of implementation status in a number of significant ATM technical fields in the APAC Region, implementation status of each Administration is assessed as Robust (90 – 100% implementation), Marginal (70 – 89%) or Incomplete (0 – 69%).

Analysis

6.8 The collated Regional ATFM implementation status data as reported in the last five years, is provided in **Table 3** below. It summarizes current implementation status. Administrations that have filed reports against the incorrect reporting tier, or have not reported at all, are indicated accordingly.

Note : The letters (A)/(B) indicate the tier of implementation status of the State (reported or otherwise).

Administration	Reports Received					Implementation Status (2022)
	2018	2019	2020	2021	2022	
Afghanistan (B)	no report	no report	no report	no report	no report	Did Not Report
Australia (A)	yes	yes	no report	Yes (87)	No report	Marginal
Bangladesh (B)	yes	yes	no report	Yes (13)	Yes (13)	Incomplete
Bhutan (B)	no report	no report	no report	no report	no report	Did Not Report
Brunei Darussalam (B)	no report	no report	no report	no report	no report	Did Not Report
Cambodia (A*)	yes	yes	no report	no report	Yes (82)	Marginal
China (A)	yes	yes	no report	Yes (87)	No Report	Marginal
Hong Kong, China (A)	yes	yes	no report	Yes (89)	Yes (89)	Marginal
Macao, China (B)	yes	yes	no report	Yes (23)	no report	Incomplete
Cook Islands (B)	no report	no report	no report	no report	no report	Did Not Report
Fiji (B)	no report	no report	no report	no report	no report	Did Not Report
France (French Polynesia) (B)	no report	no report	no report	no report	no report	Did Not Report

DPR Korea (B)	no report	no report	no report	no report	no report	Did Not Report
India (A)	yes	yes	yes	Yes (92)	Yes (84)	Marginal
Indonesia (A)	yes	yes	yes	Yes (71)	Yes (63)	Marginal
Japan (A)	yes	yes	no report	Yes (89)	No Report	Marginal
Kiribati (B)	no report	no report	no report	no report	no report	Did Not Report
Lao PDR (A)	no report	no report	no report	no report	No report	Did Not Report
Malaysia (A)	yes	yes	Yes (16)	No report	No report	Incomplete
Maldives (B)	yes	yes	Yes (20)	no report	no report	Incomplete
Marshall Islands (B)	no report	no report	no report	no report	no report	Did Not Report
Micronesia (B)	no report	no report	no report	no report	no report	Did Not Report
Mongolia (B)	no report	no report	Yes (39)	No report	no report	Incomplete
Myanmar (B)	yes	yes	Yes (30)	no report	no report	Incomplete
Nauru (B)	no report	no report	no report	no report	no report	Did Not Report
Nepal (B)	yes	yes	Yes (0)	no report	no report	Incomplete
New Caledonia (B)	yes	yes	Yes (43)	no report	no report	Incomplete
New Zealand (A)	yes	yes	Yes (44)	no report	Yes (67)	Incomplete
Pakistan (B)	yes	yes	no report	Yes (11)	Yes (80)	Marginal

Palau (B)	no report	no report	no report	no report	no report	Did Not Report
Papua New Guinea (B*)	yes	yes	Yes (21)	no report	no report	Incomplete
Philippines (A)	yes	yes	no report	Yes (61)	No report	Incomplete
Republic of Korea (A)	yes	yes	no report	Yes (82)	Yes (87)	Marginal
Samoa (B)	no report	no report	no report	no report	no report	Did Not Report
Singapore (A)	yes	yes	yes	Yes (97)	Yes (97)	Robust
Solomon Islands (B)	no report	no report	no report	no report	no report	Did Not Report
Sri Lanka (B)	no report	no report	no report	no report	no report	Did Not Report
Timor Leste (B)	no report	no report	no report	no report	no report	Did Not Report
Tonga (B)	no report	no report	no report	no report	no report	Did Not Report
Thailand (A)	yes	yes	yes	Yes (90)	Yes (90)	Robust
Tuvalu (B)	no report	no report	no report	no report	no report	Did Not Report
United States (A)	yes	yes	no report	Yes (94)	No report	Robust
Vanuatu (B)	no report	no report	no report	no report	no report	Did Not Report
Viet Nam (A)	yes	yes	no report	Yes (34)	Yes (34)	Incomplete

Table 3: ATFM Implementation Status

6.9 Out of 39 States and two Special Administrative Regions in APAC Region, 23 Administrations have reported ATFM implementation status at least once in the last five years. The ATFM implementation of only three Administrations; Singapore, Thailand and United States, have been assessed as Robust.

6.10 The COVID-19 pandemic has caused significant traffic downturn and consequently the

needs for ATFM measures has reduced. However, the implementation of cross-border ATFM has resulted in a collaborative environment over the years across many States. The ATFM platform has enabled exchange of information through web conferences and electronic data exchanges. The ATFM infrastructure at many States has also contributed during large scale airspace contingency scenarios.

ATFM and ACDM Implementation Indicators

6.11 In the first ICAO's APAC Ministerial Conference on Civil Aviation in Beijing in January 2018, the Ministers in charge of civil aviation representing 36 governments endorsed the Beijing Declaration formalizing their shared commitments on high-priority aviation safety and efficiency objectives. Implementation of Air Traffic Flow Management (ATFM) and Airport Collaborative Decision Making (A-CDM) at all high density airports and airspaces by 2022 is accorded top priority in the Beijing Declaration.

6.12 The following two indicators have been considered to reflect on the current implementation status as of 2022.

- Number of international high density airports with Airport-CDM implemented (Figure 7) , and
- High density FIRs and FIRs supporting Major Traffic Flows and high-density aerodromes with ATFM/CDM implemented (Figure 8)

Note: High Density airport = airport with 100,000 scheduled movements per annum or more (Asia/Pacific Seamless ATM plan, V2.0, September 2016)

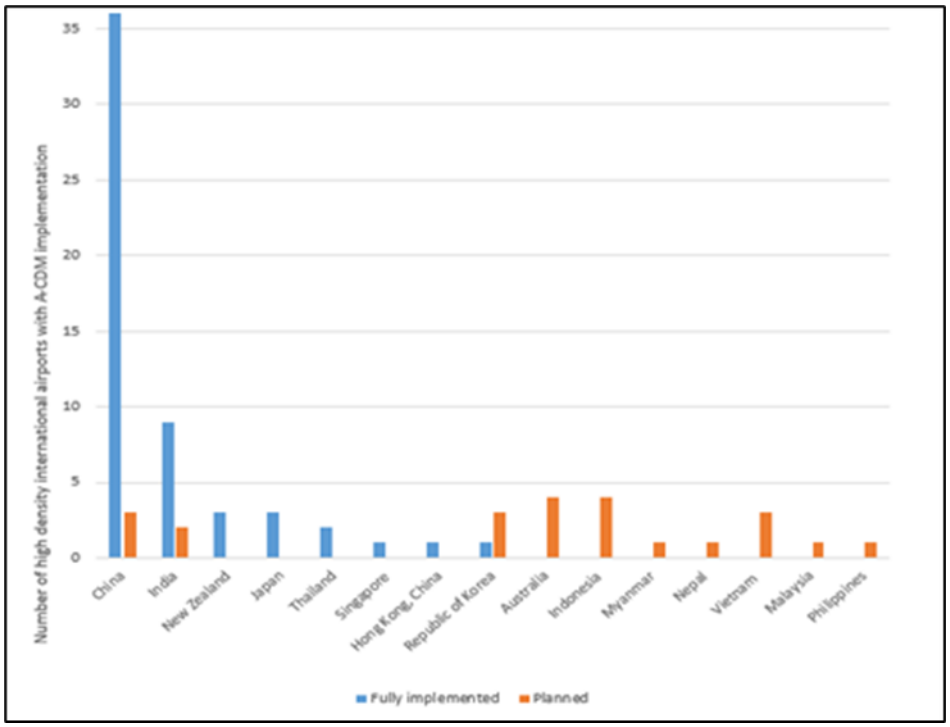


Figure 7: A-CDM Implementation in APAC Region Airports

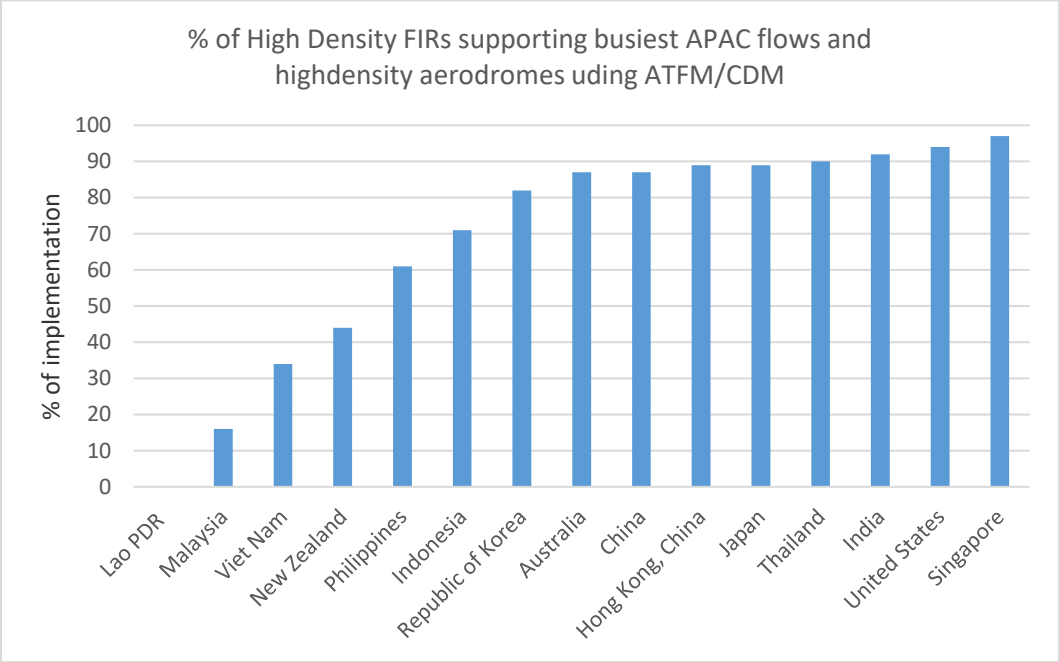


Figure 8: ATFM Implementation in High Density FIRs (as per APSAP Seamless Plan)

6.13 ATFM implementation is progressing in APAC but many efforts and collaboration among States are expected. Sub regional ATFM initiatives need to be harmonized to ensure full benefits of ATFM in APAC.

Multi-Nation, Cross Border ATFM Programs

6.14 Much progress has been made in multi-nation collaborative ATFM implementations, such as Asia Pacific Multi Nodal ATFM Collaboration (AMNAC) and Northeast-Asia Regional ATFM Harmonization Group (NARAHG). The following paras provide a brief update on each of the respective implementation programs.

Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC)

6.15 Following the development and adoption of Distributed Multi-Nodal ATFM Network concept as the foundation of regional ATFM in Asia/Pacific, several States/Administrations banded together for an Operational Trial project aimed at validating and operationalizing the concept in live environment. The initiative, originally named the Distributed Multi-Nodal ATFM Operational Trial, began in 2015 and followed a phased approach to methodically develop and validate cross-border distributed ATFM procedures for the region.

6.16 In the subsequent years, the initiative expanded both in terms of membership and operational experience. The initiative now comprises 11 Asia/Pacific States/Administrations with varying levels of ATFM maturity, structured such that they can contribute according to their needs and readiness. The expansion of membership has also allowed the initiative to introduce distributed ATFM measures in live environment, with network members utilizing the jointly developed Common Operating Procedure as a basis for administering and facilitating compliance to the measures. The ATFM measures, particularly the Ground Delay Programs (GDP), have been applied in various types of demand-capacity imbalances ranging from planned aerial events to unplanned capacity constraints at aerodromes or airspace and emergency infrastructure outages.

6.17 Recognizing the maturity of the initiative, members agreed to change the name of the

initiative to Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) and to transition the focus from operational trials to full implementation. Current focus areas now include improving the common operating procedure, expanding the AMNAC network, providing operational inputs to the development of SWIM-based ATFM information exchange, supporting members in upgrading their ATFM maturity, and harmonizing with other ATFM initiatives in the region.

Northeast-Asia Regional ATFM Harmonization Group (NARAHG)

6.18 In 2014, to respond to the rapidly increasing demand for traffic in Northeast Asia, China, Japan and the Republic of Korea established a sub-regional ATFM group, "Northeast-Asia Regional ATFM Harmonization Group (NARAHG)". The objective is to achieve the implementation and harmonization of ATFM/CDM procedures and practices to support international flights in Northeast-Asia to promote regional air traffic safety, capacity, and efficiency with the development of a concrete operational improvement. Thus, this appropriate Demand and Capacity Balance (DCB) will contribute to the ATM operation for all stakeholders.

6.19 To achieve the above mentioned goal, NARAHG is manly working on:

- Sharing relevant and necessary information on the current air traffic situation;
- Developing an operational mechanism to support cross-border ATFM harmonization including regular joint ATFM post-operations analysis;
- Developing a harmonized technical and operational communication protocol/procedures/tools to support the associated agreed ATFM/CDM operations; and
- Coordinating the development of a technical and operational communications document defining the protocols and procedures for ATFM operations.

6.20 In addition, NARAHG is striving to operate a new conceptual ATFM measures by exchanging flight trajectory data in real time to mitigate the inefficiency caused by conventional ATFM measures such as MINIT, level capping or etc. In this regard, NARAHG members are cooperating to develop the operation procedure and ultimately promoting cross-border ATFM optimized for the environment and characteristics of the three States.

6.21 By continuously improving operating procedures and complementing the systems, sub-region can implement a harmonized seamless ATFM by an appropriate DCB. Maintaining an optimal DCB will contribute to the ATM operation for all stakeholders.

PERFORMANCE IMPROVEMENT PLAN

Note: prior to implementation, ATFM systems and procedures should be verified by safety assessment under State Safety Management Systems.

ATFM Related Performance Objectives of the Seamless ANS Plan

7.1 The Asia/Pacific Seamless ANS Plan, Version 3.0, November 2019 , specifies performance objectives under Preferred Aerodrome/Airspace and Route Specifications (PARS) and Preferred ANS Service Levels (PASL), to be implemented in four phases :

- PARS/PASL Phase I – had an expected implementation by 12 November 2015 (Phase I elements that had not been completed as at 2019 were moved to Phase II);
- PARS/PASL Phase II – had an expected implementation by 07 November 2019;
- PARS/PASL Phase III - expected implementation by 03 November 2022; and
- PARS/PASL Phase IV – expected implementation by 27 November 2025.

7.2 ATFM-related performance objectives of the Seamless ANS Plan, summarized as follows, were taken into account in the formulation of Regional ATFM performance objectives specified in this Framework:

7.1 All international aerodromes should enable, in accordance with an Airport Master Plan, aerodrome management and coordination services:

a) when traffic density requires, an appropriate apron management service to regulate aircraft operations in coordination with ATS;

c) regular airport capacity analysis, which included a detailed assessment of passenger, airport gate, apron, taxiway and runway capacity.

7.3 All international aerodromes should operate an A-CDM system for ACIS integrated with the ATM network function.

7.16 Civil-Military Airspace expectations are as follows:

b) SUA should be regularly reviewed to ensure the activities that affect the airspace, and size and timing of such activity are accurately reflected by the SUA type, dimensions, activation notice and duration of activation.

7.17 States should implement regulations supporting the integration of UAS operations in non-segregated airspace, using a risk-based approach and in accordance with the Asia/Pacific Regional Guidance for the Regulation of UAS, as a minimum.

7.32 All international aerodromes where ATFM facilities are required should be served by AMAN/DMAN facilities.

Note: All AMAN systems should take into account airport gates for runway selection and other aircraft departures from adjacent gates that may affect arriving aircraft.

7.36 ATC units should conduct Airspace Planning and enable systems that manage direct

and flexible routings where practicable, and the optimal operation of FUA.

7.37 All ATC Sectors should have a nominal aircraft capacity figure based on a scientific capacity study and safety assessment, to ensure safe and efficient aircraft operations.

7.38 All ACCs operating within FIRs where demand may exceed capacity should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements, initial integration of ASM with ATFM, Collaborative Network Flight Updates, Basic Network Operation Planning and Initial Airport/ATFM slots, A-CDM Network Interface and Dynamic Slot Allocation.

7.41 Aeronautical meteorological observations, forecast, warning, climatological and historical products (such as aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) should be disseminated to users, and in accordance with global and regional guidance material. An agreement between the MET authority and the appropriate ATS authority should be established to ensure the appropriate exchange of meteorological information obtained from aircraft.

7.44 Civil-Military ATM expectations are as follows:

a) a national Civil-Military body should be formed to coordinate strategic civil- military activities (military training should be conducted in locations and/or at times that do not adversely affect civilian operations, particularly those associated with major aerodromes);

- *PARS/PASL Phase III*

7.18 All international aerodromes should operate an A-CDM system integrated with the ATM network, and an AOP and where practicable an APOC.

7.46 All ATC units providing services to international aerodromes should operate extended arrival metering.

7.51 ACCs should enable, where practicable, Free Route Airspace, RNP routes, Advanced FUA and Airspace Management (ASM), Dynamic Sectorisation, Enhanced Conflict Detection Tools and Conformance Monitoring and Multi-Sector Planner Function.

7.52 All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Short Term ATFM measures, Enhanced NOPS Planning, Enhanced integration of airport operations and NOPS planning, Enhanced Traffic Complexity Management, Full integration of ASM with ATFM, Initial Dynamic Airspace configurations, Enhanced ATFM slot swapping, Extended Arrival Management, ATFM Target Times and Collaborative Trajectory Options Programme supporting the integration of time-based management within a flow centric approach.

7.56 All States should ensure that aeronautical meteorological products supported by automated decision systems or aids using IWXXM.

7.3 The regional ATFM performance objectives specified in Section 7 of this framework – Performance Improvement Plan, complement and where necessary expand upon the performance objectives of the Seamless ANS Plan.

Structure of the Performance Improvement Plan

7.4 Regional collaborative ATFM performance objectives are arranged in Regional ATFM

Capability phases aligned, where practicable, with Phases I – IV of the Asia/Pacific Seamless ANS Plan's Preferred Aerodrome/Airspace and Route Specifications (PARS) and Preferred ATM Service Levels (PASL):

- PARS/PASL Phase I – expected implementation by 12 November 2015; and
- PARS/PASL Phase II – expected implementation by 07 November 2019;
- PARS/PASL Phase III – expected implementation by 03 November 2022; and
- PARS/PASL Phase IV – expected implementation by 27 November 2025.

7.5 Recognizing the short lead time between the finalization of the Version 3.0 of the Framework and PARS/PASL Phase I, Regional ATFM Capability Phase I were further divided into sub-phases A and B, with expected implementation 12 November 2015 and 25 May 2017 respectively.

7.6 Recognizing also the substantial performance expectations in PARS/PASL Phase III, the different update cycles between the Asia/Pacific Seamless ANS Plan and the Framework, the significant impact due to COVID-19 pandemic, and the potential benefits of a more granular progress tracking, Regional ATFM Capability Phase III is further divided into sub-phases A and B, with expected implementation of 03 November 2022 and November 2025.

Note: No ATFM-related initiative is identified in PARS/PASL Phase IV of the Asia/Pacific Seamless ANS Plan, version 3.0 (November 2019).

7.7 Accordingly, the various phases of Regional ATFM Capability can be summarized as follows:

- Phase IA, expected implementation by 12 November 2015 (aligned with Seamless ANS Plan Phase I)
- Phase IB, expected implementation by 25 May 2017 and
- Phase II expected implementation by 07 November 2019 (Aligned with Seamless ANS Plan Phase II.)
- Phase III A expected implementation by November 2022
- Phase III B expected implementation by November 2025.

7.8 At the time of this edition (2022), the deadline for phases IA, IB, and II capability implementation has passed. The expected capabilities for those phases are still retained in the document for reference as States/Administrations may not have implemented all elements in those phases yet.

7.9 Performance objectives are presented under the following general structure for each Regional ATFM Capability Phase, where relevant:

- ATFM and Other Related Regulations
- ATFM System
- Strategic ATFM, Pre-Tactical ATFM or Tactical ATFM
    - Capacity and Demand Monitoring and Analysis
    - Capacity Improvement
    - ATFM Execution
    - ATFM Measures

- Post-Operations Analysis
- ATFM/A-CDM Integration
- Civil-Military ATM Coordination

ATFM Program Airports

7.10 ATFM Program Airports~~,~~ referenced in the performance objectives~~,~~ are:

- Airports where strategic slot allocation is implemented; and
- All other airports designated by the relevant authority as requiring or potentially requiring ATFM implementation.

REGIONAL ATFM CAPABILITY PHASE IA

Expected implementation by 12 November 2015

ATFM Regulations

7.11 Air traffic flow management (ATFM) shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

Annex 11 to the Convention on Civil Aviation section 3.7.5.1 refers.

Strategic Capacity and Demand Monitoring and Analysis

7.12 A regular program of bi-annual strategic airport and airspace capacity and demand analysis should be implemented for all international airports and associated terminal area airspace, and for all en-route ATC sectors supporting the homogeneous ATM areas and major traffic flows identified in the Asia and Pacific Regions[6] (Figure 13), including consideration of:

- CNS systems;
- ATC resources and capability;
- ATC separation standards and techniques;
- runway occupancy times;
- seasonal schedules; and
- historical traffic data and traffic growth forecasts

{ [6] Asia and Pacific Regions (APAC) Air Navigation Plan, Volume II, April 2022. }

7.13 Where strategic analysis indicates that demand does not yet exceed capacity, preparation for the implementation of ATFM capability should be based on careful analysis of current traffic and expected growth in the next 5 years;

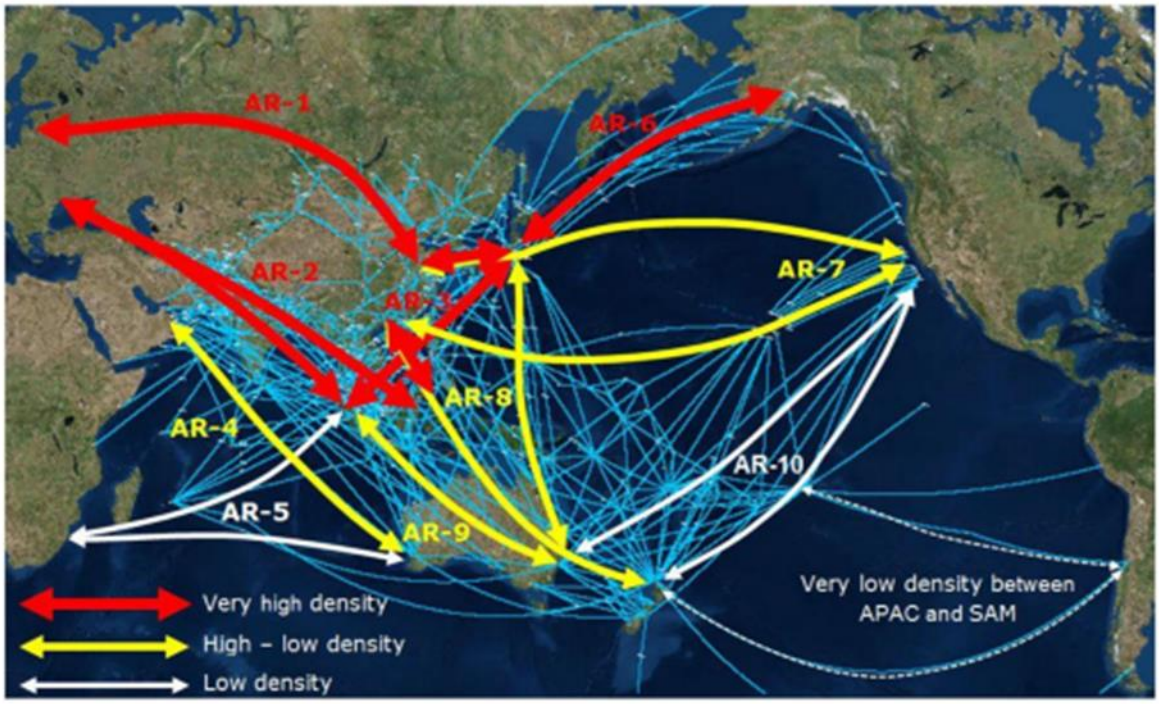


Figure 9 : Homogeneous ATM Areas and Major Traffic Flows Identified in the Asia and Pacific Regions *(Source: Asia and Pacific Regions (APAC) Air Navigation Plan, Volume II, April 2022)*

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.14 Daily pre-tactical airport and airspace capacity and demand analysis should be conducted for all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors supporting the busiest Asia/Pacific city pairs, including consideration of:

i. expected runway and airspace configurations;

ii. forecast meteorological phenomena;

iii. ATC resources, facilities and equipment;

iv. other known or expected capacity constraints; and

v. updated flight schedule and flight plan information.

Pre-Tactical ATFM Execution

7.15 ATFM Daily Plan (ADP) for all ATFM Program Airports and associated terminal area airspace, including airport and airspace capacity declarations and related background information, should be prepared and distributed to all relevant stakeholders.

ADP should be distributed to stakeholders by either:

i. Web-based ATFM network; or

ii. Web-pages hosted by each participating ANSP; or

iii. Email distribution.

Relevant stakeholders include:

a) Neighbouring ATFMUs or, where not provided, ATSUs

b) ATSUs supported by the originating ATFMU;

c) Relevant airport operators; and

d) Participating aircraft operators.

7.16 ADP should be coordinated by the responsible ATFMU or ATSU and agreed with all relevant stakeholders, through chairing and/or participation in scheduled and, where necessitated by changes in airport or airspace capacity or other events, ad-hoc ATFM conferences for pre-tactical ATFM planning.

Post-Operations Analysis

7.17 The accuracy and effectiveness of capacity and demand analyses and ADP preparation and distribution, including supporting information listed in paragraph 7.7, should be verified through comparison with operational outcomes observed, and rectification of discrepancies included in planning for system and process improvements.

REGIONAL ATFM CAPABILITY PHASE IB

Expected implementation by 25 May 2017

ATFM Systems

7.18 Operational FPL and ATS message distribution systems and processes should be analysed and, where necessary, modified to ensure that FPL, CHG, DEP, DLA and CNL messages are originated, distributed and processed in accordance with the requirements specified in ICAO Doc.4444 PANS-ATM.

7.19 Requirements should be published in all relevant State AIP, specifying that, except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours prior to EOBT.

7.20 Where the delay is the result of a GDP, CTOT and other slot allocation information originated from the ATFM unit responsible for the destination airport shall be made available to the airlines, relevant ATS unit and ATFM units.

7.21 A DLA message should be transmitted when the departure of an aircraft, for which basic flight plan data FPL has been sent, is delayed by more than 15 minutes after the estimated off-block time contained in the basic flight plan data.

7.22 Subject to local ATFM procedures, the responsibility for the origination of DLA messages should be of the departure ATS Unit, the airspace user, or any other authorized unit. Subsequent transmission of the DLA message would be in accordance with the provisions of ICAO Doc 4444 PANS-ATM.

7.23 Appropriate procedures should be implemented to ensure that FPL are not discarded from other ATM systems as a consequence of ATFM delay.

7.24 ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations. The implementation of an integrated ATFM and A-CDM network will complement each other and together

create a seamless air traffic environment.

Note: FIXM version 3.0 or later, extended where necessary is the agreed format for exchange of ATFM information in the Asia/Pacific Region.

Remark : "The current version of FIXM core provision is version 4.2. The agreed ATFM information exchange model for in the Asia/Pacific region is therefore changed to FIXM version 4.2 (or later), extended where necessary. This expectation is reflected in the Regional ATFM Capability Phase IIIB"

Note: Where SWIM-based ATFM communications capability is not yet established, ATFM messages identified in the Asia/Pacific AFTN/AMHS-Based Interface Control Document for ATFM may be used for distribution of ATFM measure information via AFTN/AMHS in the interim.

Capacity Improvement

7.25 Airport and terminal airspace capacity should be increased through optimized ATC separation standards and techniques and reduced runway occupancy at all ATFM Program Airports and in associated terminal area airspace.

Strategic ATFM Execution

7.26 Implement strategic airport slot allocation at all international airports, for periods where demand significantly exceeds the airport's capacity.

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.27 Pre-tactical modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace.

Pre-Tactical ATFM Execution

7.28 CDM capability should be implemented, enabling the sharing of all relevant information with all stakeholders, providing continuous availability of information and common reference material for daily and ad-hoc ATFM conferences.

Tactical Capacity and Demand Monitoring and Analysis

7.29 Dynamic update of airport and airspace capacity constraints, capacity calculation, demand information using schedule, flight plan and ATS messaging, and ATM system information and modelling of tactical ATFM programs should be implemented.

Tactical ATFM Execution

7.30 Tactical ATFM at ATFM Program Airports should be implemented when required using:

- Ground Delay Programs (GDP) with the assignment of Calculated Take-Off Time (CTOT), or
- Minutes in trail (MINIT) or miles in trail (MIT) or other ATFM measures specified in ICAO Doc 9971 – Manual for Collaborative ATFM.

Note: MINIT and MIT can increase the workload of upstream ATSUs and can result in

extensive and unpredictable delays as the requirements traverse many FIRs. Extended use of these measures should therefore be minimized.

7.31 All States should ensure that local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT are implemented. (Refence to Appendix B)

Note 1: At controlled aerodromes, CTOT compliance should be facilitated through the cooperation of the aircraft operator and the issuance of ATC clearances. As a minimum, CTOT should be made available to the relevant ATC tower and the aircraft operator;

Note 2: For flights departing aerodromes where an ATC service is not provided, CTOT information should be made available to the aircraft operator and the first ATS unit providing services to the flight.

Note 3: States planning to implement ground delay programs should ensure adequate time is provided for local procedure development and promulgation at aerodromes where CTOT will be applied.

7.32 CTOT for individual aircraft should, where necessary, be revised or cancelled.

7.33 Tactical ATFM should be implemented for operations through constrained airspace sectors, only during periods affected by the constraint.

7.34 As far as practicable, individual aircraft should not be subject to more than one tactical ATFM measure per flight.

Post-Operations Analysis

7.35 Procedures and agreements should be developed to ensure post-operational analysis of cross-border ATFM programs, including the canvassing and consideration of feedback from airspace users, airports operators, ATS and other ATFM units. Daily collaborative conferences among stakeholders should be held, supplemented where necessary by ad-hoc conferences called to assess the outcomes of programs of ATFM measures responding to non-normal situations.

7.36 The results of post-operations analyses should be used for planning ATFM, airspace and ATS route improvements.

The Asia/Pacific ATFM Post-Operations Analysis Recommended Framework, which can be found at ICAO Asia/Pacific eDocument webpage, provides guidance on ATFM post-operations analysis.

REGIONAL ATFM CAPABILITY PHASE II

Expected implementation by 07 November 2019

ATFM Systems

7.37 ATFM information distribution capability utilizing FIXM Version 3.0 (or later)* should be implemented for the exchange of flight specific ATFM information including CTOT, CTO, and CLDT.

**Note : "The current version of FIXM core provision is version 4.2. The agreed ATFM information exchange model for in the Asia/Pacific region is therefore changed to FIXM version 4.2 (or later), extended where necessary. This expectation is reflected in the Regional ATFM Capability Phase IIIB"*

7.38 ATFM systems implemented should have the following capabilities

i. Capability to share ATFM Daily Plan (ADP) providing information on demand/capacity imbalance issues and planned/expected ATFM measures;

ii. Capability to allocate ATFM slots and distribute necessary information such as CTOT, CTO, and CLDT when slot-based measures such as Ground Delay Program are to be used;

iii. Capability for authorized users to manage ATFM slots through revision, cancellation, and swapping; and

iv. Capability to monitor or collect data for the purpose of monitoring and reporting ATFM slot compliance, whether real-time automated or as part of post-operations analysis process..

7.39 Full interoperability of cross- border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, to provide seamless gate-to-gate collaborative ATFM operations

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.40 Automated modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace and, where possible, en-route airspace supporting the busiest Asia/Pacific Region city pairs and high density major traffic flows.

Tactical Capacity and Demand Monitoring and Analysis

7.41 Meteorological services to support ATM in the terminal area (MSTA) should be implemented, including near-term or now-casting forecasts of convective weather activity at or affecting ATFM Program Airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.

Note: Annex 3 requires that States ensure the quality management of meteorological information.

Tactical ATFM execution

7.42 ATFM measures should be applied to flights through constrained airspace.

7.43 Ground Delay Programs utilizing CTOT should be applied when appropriate to:

i. aircraft destined for constrained ATFM Program Airports, that have not yet departed; and

ii. aircraft planned to operate through constrained airspace where tactical ATFM measure CTO at RFIX or AFIX is in place, that have not yet departed.

7.44 ATFM systems should have the capability to take into account long haul flights.

7.45 Systems should be in place to ensure the timely update of estimate information for airborne aircraft.

7.46 A-CDM-related performance expectations - A-CDM-related performance expectations at

A-CDM program airports are illustrated in Chapter 10 of Asia/Pacific A-CDM Implementation Plan to map with APAC Seamless ANS Plan and Regional Framework for Collaborative ATFM expectations. See Appendix III-D of Doc 9971 for a list of sample key performance indicators for A-CDM systems.

REGIONAL ATFM CAPABILITY PHASE IIIA

Expected implementation by 3 November 2022

Capacity and Demand Monitoring and Analysis

7.47 Regular reviews of airspace usage, including areas operated under the FUA concept, should be conducted; considerations should be given t identifying and mitigating bottlenecks using techniques including – inter alia – direct and flexible routings and optimal sharing of civil/military airspace based on up-to-date demand information.

ATFM/A-CDM Integration

7.48 A-CDM should be implemented at international aerodromes and, when implemented, should be integrated with ATFM operations with appropriate information exchange between the two systems and processes.

Civil-Military ATM Coordination

7.49 National Civil-Military ATM Coordination body should be established to enable strategic, pre-tactical, and tactical airspace management (ASM), allowing closer coordination between civil and military airspace authorities and effective usage of airspace appropriate to both civil traffic demand and military mission requirements.

7.50 Special Use Airspace (SUA) should be regularly reviewed under the auspice of Civil-Military ATM Coordination body to ensure optimal use of all airspace areas in accordance with the flexible use of airspace (FUA) concept.

REGIONAL ATFM CAPABILITY PHASE IIIB

Expected implementation by 2025

ATFM and Other Related Regulations

7.51 Appropriate regulations should be established to support the integration of UAS operations in non-segregated airspace to ensure the safe and efficient operations of manned aircraft, especially when ATFM measure is applied.

ATFM Systems

7.52 ATFM information distribution capability utilizing FIXM version 4.2 (or later), extended where necessary, should be implemented for the exchange of flight-specific ATFM information.

7.53 ATFM, AMAN/DMAN, and A-CDM systems should be integrated through effective cross-platform information exchange, utilizing FIXM version 4.2 (or later) with necessary extension to facilitate common-format exchanges.

Strategic Capacity Improvement

7.54 Techniques and tools to enhance ATC capacity including Free Route Airspace, RNP

routes, ASM concept with FUA operations, dynamic sectorization, and enhanced conflict detection should be explored and implemented based on safety case and cost-benefit analysis.

Tactical Capacity and Demand Monitoring and Analysis

7.55 Meteorological information exchange with ATM and ATFM systems should be in IWXXM version 3.0 or later.

Tactical Capacity Improvement

7.56 Extended arrival metering for international aerodromes should be explored and, if deemed necessary, implemented in collaboration with adjacent States to increase predictability and enhance arrival management effectiveness across FIRs.

Tactical ATFM Execution

7.57 Advanced/enhanced ATFM-related solutions including – inter alia – ASM/ATFM full integration, dynamic airspace configurations, target time operations, and collaborative trajectory options should be explored and implemented based on stakeholders' needs, safety case, and cost-benefit analysis.

RESEARCH AND DEVELOPMENT POSSIBILITIES

Research and Development

8.1 Version 1.0 of the Regional Framework for Collaborative ATFM provides the initial framework for implementation of a distributed multi-nodal ATFM network, as envisaged in the Regional ATFM Concept of Operations. This concept, will continue to develop as experience is gained through trials and subsequent operational implementation. The Framework is therefore iterative in nature, and will require regular update in the medium term.

8.2 Further research and development of the distributed multi-nodal ATFM network concept will largely be conducted by ATFM/SG participating States through their operations trial programs, consistent with Principle 36 of the Asia/Pacific Seamless ATM Plan Principle 36 – 'Clustering' for the research, development and implementation of ATM projects. The outcomes of trials and lessons learned from operational deployment will be considered by ATFM/SG for the improvement and updating of the Framework.

ATFM information sharing

8.3 To achieve a seamless information sharing among ATFM Nodes, while at the same time being able to maintain the flexibility to accommodate new users and additional customized functions of individual ATFM systems, a system-to-system connection designed according to ICAO System-Wide Information Management (SWIM) concept has been identified as viable and suitable solution for the Distributed Multi-Nodal ATFM operation.

8.4 SWIM Task Force along with ATFM technical team has undertaken work towards drafting the technical specifications for system-to-system connection and the exchange of ATFM data over a regional SWIM infrastructure (CRV).

8.5 To support the ATFM information exchange for cross-border ATFM operations and ATFM/A-CDM integration in the Asia/Pacific Region, the Asia/Pacific SWIM Task Force (SWIM TF), developed the Flight Information Exchange Model (FIXM) version 4.1 Extension. Currently FIXM version 4.2, extended where necessary, is the agreed *ATFM information exchange model for exchanging ATFM data between ATFM systems in the Asia/Pacific Region*

8.6 Subject to the availability of the baseline SWIM specifications for ATFM service and CRV connectivity, further review of the feasibility of system technical trials on CTOT Distribution, CTOT Revision, CTOT Cancellation, and CTOT Request to enable its long-term development of ATFM SWIM-based technical specifications will be required.

Collaborative ATFM Concept Developments

8.7 The following concepts should be researched, and developed, for implementation in the Asia/Pacific Region:

a. Delay Absorption Intent – included in the Regional ATFM Concept of Operations, provides aircraft operators with the flexibility to choose how to distribute the delay assigned by an ATFM measure to various phases of flight. Not yet included in the ATFM Performance Improvement Plan, this concept has the potential to improve outcomes by increasing the number of aircraft participating in the program, through the application of ATFM delays to longer distance flights that are currently exempt from ground delay programs. The development of this concept will be undertaken in trials before then being potentially included in the broader Framework.

b. The ASBU module NOPS Block 1 aims to introduce enhanced processes to manage flows and improve overall fluidity. One of the main features of ATFM in Block 1 includes the development of "management of arrival/overfly times Targeted time of arrival (TTA)/ Targeted time over (TTOs)". With TTA/TTOs, it is envisaged that the intended ATFM measures would be more encompassing, increasing dynamism of flow management, while ensuring equity in delay management. This enhanced ability must be complimented by continuous developments on the reliable and precise information sharing, and exchange mechanism, which eventually will also form the foundation for implementation of System Wide Information Management (SWIM) and Flight and Flow in Collaborative Environment (FF-ICE).

c. Application of ATFM Measures to Long Range Flights – will improve equity in ATFM processes, and contribute to better outcomes in those ATC sectors where long range flights are currently exempt from all but minimal en-route delays. This will require further development of ATFM measures the CTO ATFM measure, and the formulation of regionally agreed limits on the total ATFM+AMAN delay that may be applied to long range and ultra-long range flights. The LR-ATFM trials in the future could also provide the opportunity to experiment with inter-airline ATFM slot negotiation as airlines would have the best knowledge of their business model and operating cost index.

d. Interoperability of ATFM, AMAN/DMAN and A-CDM systems – will require ANSPs and airport operators to collaboratively develop their local operational letters-of-agreement to incorporate procedures and practices optimizing gate-to-gate flow management of flights.

e. Development and implementation of interoperability among A-CDM and ATFM platforms should incorporate considerations of relevant milestones involved, open standards for sharing data with systems across border, alignment of compliance criteria in A-CDM and ATFM, and coordinated timing for data exchange matched with data availability timeline. Further exploration will be needed on A-CDM and ATFM enabling systems and integration solutions including SWIM concepts and infrastructure and how SWIM and existing XMLs can support connecting the two disciplines for an overall improvement in benefits for service providers and aircraft operators. Specifically, the developments related to ACDM B1 modules on Airport Operations Plan data sharing which support strategic flow management and refinement of ATFM Daily Plan will need to be explored.

f. Collaborative Trajectory Options – provide for flexible routing options that permit aircraft operators to elect to re-route flights via longer trajectories to avoid constrained airspace and take advantage of the reduction or removal of ground delay (or en-route delay, where implemented) that would be imposed if the flight continued through the constrained airspace. A collaborative trajectory options program would significantly improve the safety and efficiency of ATM in cases of large scale weather deviations (LSWD) such as those experienced in the cyclonic weather season in the Bay of Bengal and South China Sea areas, and contingency operations including the avoidance of airspace that is either unsafe (e.g. volcanic ash cloud) or unavailable. A collaborative trajectory options program would first require a full understanding of airspace capacity, which should be supported by a comprehensive study.

g. The development of a collaborative trajectory options program in the Asia/Pacific Region, particularly in South East Asia, will require a coordinated multi-partite effort to improve the regional ATS route network and ATS surveillance/communications

infrastructure, and to provide sufficient ATS route options for the program. ATS route specification and implementation of surveillance and communications infrastructure are included in the performance objectives of the Seamless ATM Plan.

h. Network Collaborative Decision-Making – to provide mechanisms within the distributed multi-nodal ATFM network for the formulation of executive flow management decisions in the event of competing stakeholder priorities. This will require research and development of network- suitable automated decision-support tools and associated business rules. Operational experience in the distributed multi-nodal ATFM network environment will be key to identifying the potential challenges, and formulating and testing strategies.

i. Harmonization of Multiple Flow Management Programs – will ensure that all ATFM measures applied are collaboratively managed to ensure that individual flights are not unduly penalized by multiple measures in one flight, and that ATFM network outcomes are more predictable. Currently aircraft may be subject to independently applied en-route and airport ATFM delays, resulting in potentially unreasonable cumulative delay over the course of a flight. A significant amount of research is being conducted, and needs to be conducted, into the effects and harmonization of multiple flow programs in multiple FIRs.

j. Development of SWM-based MET information services specifically addressing the needs of ATFM in the APAC region – APAC MET R WG is developing use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region. It will also look into assisting the SWIM TF in identifying and developing specifications of information services for exchange of MET information supporting ATFM operations.

9. MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones and Timelines

9.1 Section 7 (Performance Improvement Plan) provides milestones and timelines for a number of elements generally aligned with the Asia/Pacific Seamless ANS Plan PARS and PASL Phase I and II, being effective 12 November 2015 and 09 November 2018 respectively:

Regional ATFM Capability Phases	Expected Implementation of ATFM	Expected Implementation as per APAC ACDM Implementation Plan	Harmonized Milestones
Phase 1 A	12 November 2015	-	2015
Phase 1 B	25 May 2017	-	2017
Phase 2	07 November 2019		2019
Phase 3 A	2022	2022	2022
Phase 3 B	2024	2025	2025

9.2 States that have not yet implemented collaborative ATFM, or having implementations that are not in accordance with the provisions of this Framework, should commence planning from the date of its approval by APANPIRG.

9.3 It should be noted, however, that the ATFM capability outlined in the Framework should be implemented as early as possible. The Framework timelines should under no circumstances be interpreted as limiting or deferring ATFM implementation where there is a current or expected need for it in an earlier timeframe than outlined.

Priorities

9.4 While it is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers, States should be aware of the Asia/Pacific Regional Priorities adopted by APANPIRG, including ASBU B0-NOPS, and the Annex 11 requirement for States to implement ATFM where there is a current or expected imbalance of demand and capacity.

Actions

9.5 This Plan is iterative in nature, and will require further development as experience is gained in operational trials of the distributed multi-nodal ATFM network concept. ATFM/SG, under its terms of reference, should continue to oversee and coordinate the development of the concept and subsequent amendment of the Framework, facilitate the coordination and alignment of CDM/ATFM programs being conducted within the Region, and review the effectiveness of existing and planned ATFM programs.

APPENDIX A: COLLABORATIVE ATFM FRAMEWORK PRINCIPLES

People: Cultural and Political Background

1. High-level political support (including development of educational information for decision-makers) to support Seamless ANS initiatives, including military cooperation and AIM.

2. Education and implementation of non-punitive reporting and continuous SMS improvement systems

Aviation Regulations, Standards and Procedures

3. Harmonised regional or sub-regional rules and guidelines, modelled on the regional application of common regulations incorporated by reference into local legislation.

4. Shared ATM operational standards, procedures, guidance materials through common manuals and templates.

6. An emphasis on delivery of ATM services based on CNS capability, resulting in flexible, dynamic systems.

ATM Coordination

8. Sub-regional ATFM based on system-wide CDM serving the busiest terminal airspace and MTF.

9. Cross-border/FIR cooperation for use of aeronautical facilities and airspace, collaborative data sharing, airspace safety assessment and ATM Contingency planning.

10. Encouragement of military participation in civil ATM meetings and in ATS Centres where necessary.

Airspace Organisation

11. Promoting flexible use airspace arrangements and regular review of airspace to ensure it is appropriate in terms of purpose, size, activation and designation.

12. The optimisation of airspace structure through amalgamation and use of technology.(Asia/Pacific Seamless ANS Plan V3.0)

Facilities: Aerodromes

13. To encourage aerodrome operators to actively participate in ATM coordination in respect of Airport CDM development and operational planning, including aerodrome complexity and capacity.

14. Planning and coordination with local authorities and government agencies to take into account environmental issues, obstacles, aerodrome and PBN development

ATS Units

15. Collaboration by ANSPs for evaluation and planning of ATM facilities.

16. Optimization of ATM facilities through amalgamation and the use of technology, including automation, satellite-based systems and remote facilities.

Aeronautical Data

30. Early implementation of AIM, including cooperative development of aeronautical databases and SWIM to support interoperable operations.

APPENDIX B: CDM/ATFM TRIAL TIERED PARTICIPATION LEVELS

ANSPs play a key role as Node Leaders in the ATFM Operations. Accurate traffic demand prediction and ATM resource outlook, effective issuance of ATFM measures, and coordination of CDM web/teleconference are important elements provided by ATFM Units and ATS Units within each ANSP. The Distributed Multi-nodal ATFM model has adopted a tiered participation level approach to provide the opportunity for ANSPs to participate based on their readiness and capability. The different participation levels also provide an avenue for ATFM Nodes to upgrade to a higher level as ATFM implementation becomes more ready and capable. It is recommended that ATFM nodes endeavour to be at Level 3 to implement Regional ATFM. The following tables outline responsibilities on the part of ANSPs at various participation levels**.**

Table 1: Level-3 ANSP Responsibilities

Level 3 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Demand-Capacity Prediction and Monitoring	• Predict traffic demand at ATM resources within the node through a range of data sources including schedules, airport slots, flight plans (FPLs) and ATS messages or other forms of flight progress updates • Predict capacities at ATM resources within the node • Assess demand-capacity imbalance • Monitor the accuracy of demand and capacity predictions
Local CDM Conference	• Host scheduled CDM conference with local stakeholders to prepare ATFM measures
Cross-Border CDM Conference	• Host or participate in cross-border CDM conference with other node leaders
ATFM Daily Plan (ADP)	• Generate ADP to outline ATM situation for the day
ATFM Measure Execution	• Ensure the effective implementation / revision / cancellation of ATFM measures in collaboration with local FMP/ATS units • Provide information on ATFM in a timely manner to relevant stakeholders in accordance to the cross-border procedures developed
ATFM Measure Effectiveness Monitoring	• Monitor ATFM measure effectiveness and revise as appropriate to the developing situations
ATFM Post-Operations Analysis	• Lead the collaborative effort to perform post-operations analysis after each round of ATFM program
Responsibilities Specific to GDP	
CTOT Distribution	• Generate CTOTs and distribute via appropriate channels preferably no less than 90 minutes before Estimated Off-Block Time (EOBT) to support stakeholder's advance planning
Slot Management	• Provide platform or protocol for slot management process (change, swap, remove, add)
Adherence to CTOT in departure management	• Manage departure traffic in adherence to CTOT within the CTOT compliance window
	• Include CTOT information as part of the air traffic control clearance when a given flight is subject to CTOT *Ref: ICAO Doc 9971, 3rd Ed., Part II, Chapter 6*
	• Ensure that local ATC procedures and CDM processes facilitating compliance with received CTOT are implemented

Table 2: Level-2 ANSP Responsibilities

Level 2 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Cross-Border CDM Conference	• Participate in cross-border CDM conference with other node leaders
ATFM Post-Operations Analysis	• Participate in the collaborative effort to perform post-operations analysis by providing information from departure side
Responsibilities Specific to GDP	
Adherence to CTOT in departure management	• Manage departure traffic in adherence to CTOT within the CTOT compliance window
	• Include CTOT information as part of the air traffic control clearance when a given flight is subject to CTOT *Ref: ICAO Doc 9971, 3rd Ed., Part II, Chapter 6*
	• Ensure that local ATC procedures and CDM processes facilitating compliance with received CTOT are implemented

Table 3: Level-1 ANSP Responsibilities

Level 1 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Participation in Project Updates	• Participate in regular project meetings to keep up to date with latest developments
ATFM Education	• Educate local stakeholders and personnel on ATFM in preparation for capability upgrade
ATFM Information Distribution	• Distribute information about ATFM initiatives to local stakeholders, e.g. information about an active ATFM measure in the region, to ensure stakeholders are aware of the project progress and implementation elsewhere
Planning for Capability Upgrade	• Study the concept of ATFM and Distributed Multi-nodal ATFM operations • Assess the needs and plan for capability upgrade, especially if supplying traffic to FIRs serviced by Level-3 ANSPs

APPENDIX C: DEMAND-CAPACITY BALANCING

General Principle

1. The implementation of Air Traffic Flow Management (ATFM) manages air traffic demand over airport or airspace where demand at times exceeds or is expected to exceed the capacity of the Air Traffic Control (ATC) services, to ensure that traffic demand is compatible with ATC capacity. The implementation of ATFM also facilitates and contributes to a safe, orderly, and expeditious flow of air traffic by ensuring that ATC capacity is optimised and utilised to the maximum extent possible.

2. In the APAC region, the regional concept for cross border ATFM is based on a Distributed Multi-Nodal ATFM Network concept, whereby each node is led by an agreed Air Navigation Service Provider (ANSP) as the Node Leader. The Node Leader is responsible for Demand-Capacity Monitoring and Balancing at ATM resources such as airports or airspace.

3. Demand and Capacity Balancing can be performed during the different ATFM phases, and it can start as early as during the strategic phase, to the pre-tactical phase and finally the tactical phase. More details on the individual ATFM phases can be found in Asia/Pacific Framework for Collaborative ATFM under the section of Background Information.

Establishment of an accurate prediction for traffic demand

4. As specified in Chapter 5 of ICAO Doc 9971, an accurate picture of the expected traffic demand can be established when reliable and accurate flight intent data are provided for ATFM services. These data can be provided by the various organisations responsible for the authorisation or execution of flights. The following data associated with flight intent can be provided to ATFM services for use in demand predictions:

   a. Airspace User (AU) marketing schedule data;

   b. airport strategic slot data from the airport slot coordination process;

   c. AU flight intent updates;

   d. ANSP ATM automation system data (e.g., ATS messages via aeronautical fixed telecommunication network (AFTN) or ATS message handling systems (AMHS), or data provided by the flight data processing (FDP) component) including:

      i. flight plans (FPL ATS message or comparable data);

      ii. flight plan amendments (CHG ATS message or comparable data);

      iii. flight plan cancellation (CNL ATS message or comparable data);

      iv. indication of departure (DEP ATS message or comparable data)

      v. indication of arrival (ARR ATS message or comparable data);

      vi. indication of flight delay (DLA ATS message or comparable data); and

      vii. flight coordination (CPL and EST ATS messages or comparable data);

   e. aerodrome departure planning and arrival information;

   f. correlated surveillance data (e.g., ADS-B, SSR, WAM, MLAT); and

   g. aircraft position report (airspace user provided position report).

Planning, assessment and declaration of capacity

5. The assessment and declaration for the various types of capacities can be referenced from Asia/Pacific Framework for Collaborative ATFM, para 5.27 to 5.36.

Addressing demand and capacity imbalance

6. ATFM measures should generally be applied during periods when demand exceeds capacity. They are techniques used for the management of air traffic demand according to system capacity and should not be applied on a routine basis.

7. During the ATFM strategic phase, discussions should be conducted between Airspace Users (AUs) and capacity providers such as ANSPs and airports for the analysis of airspace, airport and ATS restrictions. In addition, significant meteorological phenomena and changes in seasonal meteorological condition should also be discussed. From these discussions, discrepancies between demand and capacity can be identified, and possible solutions can be jointly developed to address the demand capacity imbalance.

8. If demand-capacity imbalances cannot be resolved in the strategic phase, pre-tactical and tactical ATFM measures may be required. Table 1 sets out the various types of ATFM measures which can be adopted during the ATFM pre-tactical and tactical phases. The table also outlines how these measures are applied, as well as the associated timeframe for its application. The list is not exhaustive and provides guidance on where the measures lie on the ATFM timeline.

9. For an effective provision of ATFM service, data exchange is required. As depicted in Figure 1, the data to be shared include information related to the flight intent, capacity, aerodrome, and airspace demand, ATFM measures, and CDM actions for the purpose of cooperation and coordination of air traffic flow management activities between ATFM stakeholders. There is also a requirement for the ATFM function to be regularly updated with information on the overall ATM resources (e.g., airspace status and aerodrome infrastructure) to understand the impact on the available capacity.

ATFM measure	*Constraint*			*Control mechanism*	*Time frame*	*Requirements to be effective*
	Airport arrivals	*Airport departures*	*Airspace*			
GDP	X	X	X	CTOT	Pre-tactical and tactical	Participation in percentage and distance
Re-route			X	Flight path change to avoid constraint	Pre-tactical and tactical	Access to airspace and published routes
Ground stop	X			Prevent departures from specific aerodromes to address existing tactical load on an arrival aerodrome	Tactical	
MIT/MINT	X		X	Time- or distance-based separation on a single stream of traffic	Tactical	
MDI	X		X	Time-based separation from departures from the same aerodrome	Tactical	
Fix balancing	X		X	Flight path change to avoid	Tactical	
Level capping			X	Flight path change to avoid	Tactical	

Table 1 Summary of ATFM Measures

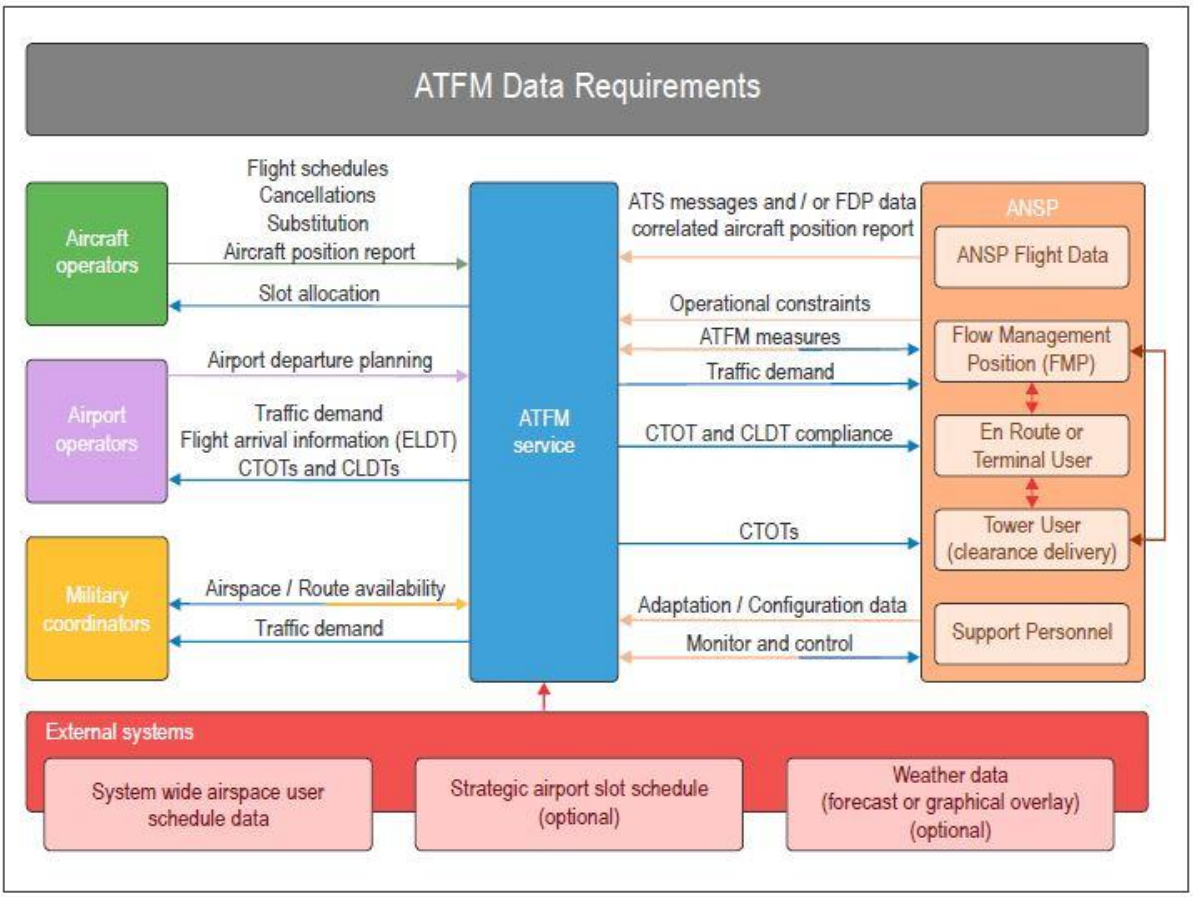


Figure 1 ATFM Data Requirements

APPENDIX D: ATFM DAILY PLAN SAMPLE TEMPLATE

ATFM DAILY PLAN	[ANSP or ATFM Unit Name]
DATE / TIME OF ISSUE	[Date]/[Time of issuance]
STATUS / REFERENCE	[Status of the ADP, e.g., *New*, *Revision 1*, etc.]/ [FIR Name_YYYYMMDD_version]

CONSTRAINTS AND IMPACT					
LOCATION	APPLICABLE PERIOD (UTC)			REMARK	EXPECTED ARRIVAL DELAY (AVERAGE)
[Constraint Loc]	[Date]	[Start]	[End]	[Constraint/Issue]	[Expected Delay]

ATFM MEASURE					
LOCATION	ATFM MEASURE PERIOD (UTC)			ATFM MEASURE	CAPACITY IMPACT
[Constraint Loc]	[Date]	[Start]	[End]	[ATFM measure]	[Capacity number]

OTHER INFORMATION
[Pertinent weather information]
[Additional instruction, e.g., CTOT compliance windows]
[Contact information, web-conference address]
[Additional remarks]

EXAMPLE ATFM DAILY PLAN

ATFM Daily Plan	RJJJ	1504022000 - 1504031959

CAPACITY and CONSTRAINTS			
Location (AD or SECT)	**APPLICABLE PERIOD**	**AAR (landings per hour)**	**CONSTRAINT/REMARK**
RJCC	2100 – 2300	04 – 06	LVP
RJTT	0200 – 0300	10	RWY34L/16R CLSD 0200 – 0245 CONST
RJTT	0300 – 0500	14	FLTCK RWY22 ILS
SECT 1	0130 – UFN	-	Developing CB

ATFM MEASURES		
Location (AD or SECT)	**APPLICABLE PERIOD**	**MEASURE REMARKS**
RJTT	2330 – 0140	CTOT DEST RJCC
SECT 12	2300 – 0005	3 MINIT DEP RJAA/RJTT
SECT 12	0130 – UFN	G585 8 MINIT AT [WAYPOINT] WB FOR ZMUB REGARDLESS OF FL

POSSIBLE/DEVELOPING ISSUES		
Location (AD or SECT)	**APPLICABLE PERIOD**	**MEASURE REMARKS**
RJAA	0300 – 0500	15 MIT, 250KT AT [WAYPOINT] [WAYPOINT]
RJTT	0300 – UFN	CTOT

APPENDIX E: ATFM TERMINOLOGY AND COMMUNICATIONS

ATFM Terminology – General

Acronym	Term	Definition
AAR	Airport Arrival Rate	Runway arrival capacity of an airport normally expressed in movements per hour
ADR	Airport Departure Rate	Runway departure capacity of an airport normally expressed in movements per hour
ASD	Aircraft Situation Display	ATC Aircraft/Traffic Situation Display
AFIX	Arrival Fix	A waypoint during the arrival phase of a flight. In the context of ATFM it could be a waypoint where an ATFM Measure may be applied
CDM	Collaborative Decision-Making	Process which allows decisions to be taken by amalgamating all pertinent and accurate sources of information, ensuring that the data best reflects the situation as known, and ensuring that all concerned stakeholders are given the opportunity to influence the decision. This in turn enables decisions to best meet the operational requirements of all concerned.
CDR	Conditional Route	ATS route that is available for flight planning and use under specific conditions
DFIX	Departure Fix	The first published fix/waypoint used after departure of a flight.
DMAN	Departure Manager	A planning system to improve the departure flows at an airport by calculating the Target Take-Off Time (TTOT) and Target Startup Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account
FCA	Flow Constrained Area	A sector of airspace where normal flows of traffic are constrained, which could be caused by meteorological conditions, military exercise etc.
FMP	Flow Management Position	A position that monitors traffic flows and implements or requests ATFM measures to be implemented
GDP	Ground Delay Program	An ATFM measure where aircraft are held on the ground in order to manage capacity and demand in a specific volume of airspace or at a specific airport. In the process, departure times are assigned. These departure times correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport
GSt	Ground Stop	A tactical ATFM measure where some selected aircraft remain on the ground at the departure airport due to severe constraint either in downstream airspace sector or an arrival airport
MINIT	Minutes in Trail	A tactical ATFM measure expressed as the number of minutes required between successive aircraft at an airspace boundary point. It is normally used in airspace

		without air traffic surveillance or when transitioning from surveillance to non-surveillance airspace, or even when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles
MIT	Miles in Trail	A tactical ATFM measure expressed as the number of miles required between successive aircraft (in addition to the minimum longitudinal requirements) to meet a specific criterion which may be separation, airport, fix, altitude, sector or route specific. MIT is used to organize traffic into manageable flows as well as to provide space to accommodate additional traffic (merging or departing) in the existing traffic flows. It will never be less than the separation minima.
RFIX	En-route Fix	A waypoint during the en-route phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
-	ATFM Measure	ATFM solution which will balance demand against capacity or facilitate the safe, orderly, and expeditious flow of air traffic

ATFM Terminology – Phase of Flight

Acronym	**Term**	**Definition**
SOBT	Scheduled off Block Time	The time that an aircraft is scheduled to depart from the parking position
EOBT	Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure; normally this should match the SOBT at airports with Strategic Slot Coordination Process
TOBT	Target Off - Block Time	The time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready to receive start-up approval/push-back clearance
TSAT	Target Start up Approval Time	The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect start-up/push-back approval
COBT	Calculated Off Block Time	A time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation, at which a flight is expected to push back / vacate parking position so as to meet a CTOT, taking into account start and taxi time.
AOBT	Actual Off Block Time	The time the aircraft pushes back / vacates parking position (Equivalent to Airline / Handlers ATD – Actual Time of Departure & ACARS=OUT)

TTOT	Target Take-Off Time	The Target Take-Off Time of an aircraft taking into account the TOBT/TSAT plus Estimated Taxi-Out Time
CTOT	Calculated Take off Time	A time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation in a Ground Delay Program, at which a flight is expected to become airborne
ETOT	Estimated Take Off Time	The Estimated Take-Off Time of an aircraft, taking into account EOBT plus Estimated Taxi-Out Time
ATOT	Actual Take Off time	The time that an aircraft takes off from the runway (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF)
ETO	Estimated Time Over	Estimated time at which an aircraft would be over a fix, waypoint or particular location typically where air traffic congestion is expected
CTO	Calculated Time Over	Time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation, at which a flight is expected to be over a fix, waypoint or particular location typically where air traffic congestion is expected
TLDT	Target Landing Time	Targeted Time from the Arrival Management process at the Threshold, taking runway sequence and constraints into account; Progressively refined planning time used to coordinate between arrival and departure management processes
CLDT	Calculated Landing Time	A landing time calculated and issued by an ATFM unit, as a result of tactical ATFM slot allocation at which a flight is expected to land on a runway
ELDT	Estimated Landing Time	The estimated time that an aircraft will touch- down on the runway
ALDT	Actual Landing Time	Actual time an aircraft lands on a runway (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON)
SIBT	Scheduled In Block Time	The Time that an aircraft is scheduled to arrive at its first parking position
CIBT	Calculated In Block Time	An in-block time calculated and issued by an ATFM unit, as a result of tactical ATFM slot allocation at which a flight is expected to be at its first parking position.
AIBT	Actual In Block Time	The time that an aircraft arrives in-blocks (Equivalent to Airline/Handler ATA –Actual Time of Arrival, ACARS = IN)

ATFM Terminology Map

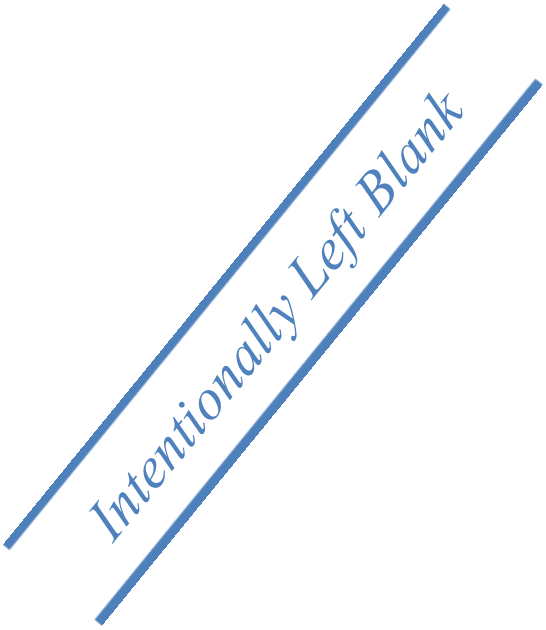
Phase of Flight	**Scheduled**	**Flight Plan**	**System Estimate**	**Target (Airline)**	**Target (A-CDM)**	**ATFM Measure**	**Estimated**	**Actual**
Off-Block Time (OBT)	SOBT	EOBT		TOBT	TSAT	COBT		AOBT
Take-Off Time (TOT)			ETOT		TTOT	CTOT	ETOT	ATOT
Time Over (TO)			ETO			CTO	ETO	ATO
Landing Time (LDT)			ELDT		TLDT	CLDT	ELDT	ALDT
In-Block Time (IBT)	SIBT					CIBT		AIBT

ATFM Phraseology

Note: The following phrases are suggested for use as an interim procedure, pending the development of globally standardized ATFM –related phraseology

Circumstance	Phraseology
Calculated take-off time (CTOT) delivery resulting from a slot allocation. The CTOT shall be communicated to the pilot at the first contact with ATC.	CTOT (*time*)
Change to CTOT resulting from a Slot Revision.	REVISED CTOT (*time*)
CTOT cancellation resulting from a Slot Cancellation	CTOT CANCELLED, REPORT READY
Start-up requested too late to comply with the given CTOT.	CTOT EXPIRED, REQUEST A NEW CTOT
Denial of Start-up when requested too late to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT EXPIRED, REQUEST A NEW CTOT
Start-up requested too early to comply with the given CTOT.	REQUEST A NEW CTOT
Denial of Start-up when requested too early to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT (*time*), REQUEST START-UP AT (*time*)

……


Intentionally Left Blank

APPENDIX F: ATFM MONITORING AND REPORTING FORM

ATFM PERFORMANCE INDICATORS

The following indicators are based on the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM, which should be read in conjunction with this form. The information provided will be used by the relevant Regional bodies to assess individual Administration and overall regional compliance with the Framework, and may be used by Administrations to internally evaluate their implementation status.

INSTRUCTIONS

A	If your administration **is expected, or intends, to implement and distribute cross-border ATFM measures** under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM: 1-42

B	If your Administration **is <u>not</u> expected to implement and distribute cross-border ATFM** as described above, answer questions 43 to 61.

A. Administrations Distributing ATFM Measures

Indicate whether your administration has:

Number	Regional ATFM Framework Performance Expectations	Response
1.	Enacted regulations for the implementation of ATFM	
2.	Implemented a program of bi-annual strategic airport and airspace capacity, and strategic demand analysis	
3.	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	
4.	Commenced daily pre-tactical airport and airspace capacity-demand analysis for ATFM Program airports and associated terminal airspace as well as enroute ATC sectors supporting the homogeneous ATM areas and major traffic flows identified in the Asia and Pacific Regions	
5.	Made arrangements for relevant ATFMU to chair and/or participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	
6.	Commenced ATFM post-operations analysis and rectification, taking guidance from the Asia/Pacific ATFM Post-Operations Analysis Recommended Framework as starting point	
7.	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	
8.	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	
9.	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	
10.	Ensured that, when there is a delay from a GDP, CTOT and other slot allocation information originated from the ATFMU is communicated to all relevant stakeholders	
11.	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	
12.	Implemented common fixes, terminology and communications in ATFM, AMAN/DMAN and A-CDM systems	
13.	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	
14.	Implemented strategic airport slot allocation at all international airports where demand significantly exceeds airport capacity	

15.	Implemented pre-tactical modelling of airport and airspace configuration and traffic demand, and the effect of ATFM measures	
16.	Implemented tactical ATFM measures for flights inbound to ATFM program airports	
17.	Enabled sharing of relevant information between all stakeholders through implementation of CDM	
18.	Implemented dynamic updating of airport and airspace capacity constraints, capacity calculations and demand information	
19.	Implemented local procedures for ATFM operations and communication, including phraseology and terminology for ATFM Units, ATS Units, airspace users, and airport operators, drawn from ICAO Doc. 9971	
20.	Established ATFM capability with appropriately trained staff and operating procedures	
21.	Developed procedures for ATFMU, ATS Units, airspace users, and airport operators when ATFM program is active	
22.	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	
23.	Implemented tactical ATFM measures for flights inbound to constrained airspace	
24.	Ensured tactical ATFM measures are only applied during periods of constraint	
25.	Promulgated procedures to avoid subjecting individual flights to more than one tactical ATFM measure	
26.	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	
27.	Ensured post-operations analyses are used for planning ATFM, airspace and ATS route improvements	
28.	Commenced daily preparation and sharing of an ATFM Daily Plan (ADP) for all ATFM Program airports and associated terminal airspace	
29.	Promulgated procedures for tactical management of ATFM measures, including revision, cancellation where necessary	
30.	Ensured interoperability of implemented ATFM, A-CDM, AMAN, DMAN, ATM automation systems and airspace user systems where operational interfaces exist or are planned	
31.	Implemented meteorological services to support ATM in the terminal area (e.g. Meteorological Service in Terminal Area -MSTA)	
32.	Implemented distributed multi-nodal ATFM information distribution capability	
33.	Ensured ATFM systems take long haul flights into account in demand predictions	
34.	Ensured ATM and ATFM systems provide timely update of estimate information for airborne aircraft	

35.	Implemented A-CDM at international aerodrome and integrated with ATFM operations with appropriate information exchange between the two systems and processes	
36.	Established national civil-military ATM coordination body to enable strategic, pre-tactical, and tactical airspace management (ASM)	
37.	Established a civil-military ATM coordination body to regularly review the use of Special Use Airspace (SUA) to ensure optimal usage all airspaces based on the FUA concept	
38.	Established regulations to support a safe integration of UAS operations in non-segregated airspace	
39.	Implemented ATFM information distribution capability utilizing FIXM v4.2 (or later), extended where necessary, to enable the exchange of flight-specific ATFM information	
40.	Integrated ATFM, AMAN/DMAN, and A-CDM systems through cross-platform information exchange based on FIXM v4.2 (or later) with appropriate extension	
41.	Established research and development programs to explore novel capacity enhancement techniques such as free route airspace, extended arrival metering, dynamic airspace configurations, target time operations, and collaborative trajectory options, with an emphasis on needs, safety case, and cost-benefit analysis	
42.	Implemented Meteorological information exchange with ATM and ATFM systems using IWXXM v3.0 (or later)	

B. States/Administrations *Facilitating* ATFM Measures (but not expected to implement and distribute cross-border ATFM)

Indicate whether your administration has:

Number	Regional ATFM Framework Performance Expectations	Response
43.	Implemented a program of bi-annual strategic airport and airspace capacity, and strategic demand analysis	
44.	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	
45.	Made arrangements for relevant personnel from ATSU to participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	
46.	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	
47.	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	
48.	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	
49.	Ensured local stakeholders are able to access CTOT information readily, either directly from the ATFMU distributing it or through local dissemination	
50.	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	
51.	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	
52.	Enabled sharing of relevant information between all stakeholders through implementation of CDM	
53.	Implemented local procedure with regards to ATFM operations and communication, including phraseologies, among ATFMU, ATS Units, airspace users, and airport operators drawn from ICAO Doc 9971	
54.	Developed procedures for ATS units, airspace users, and airport operators when ATFM program is active	
55.	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	
56.	Developed ATFM post-operations analysis workflow among ATFMU, ATS units, airspace users, and airport operators to ensure proper and timely feedback mechanism can be distributed to ATFMU originating the ATFM measures	
57.	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	

58.	Ensured post-operations analyses are used for planning ATFM, airspace, and ATS route improvements	
59.	Ensured capability to receive ATFM Daily Plan (ADP) from Administrations distributing the ATFM measures and to distribute it among local stakeholders for situational awareness	
60.	Ensured ATM systems provide timely update of estimate information for airborne aircraft	
61.	Educated ATM staff and stakeholders on the basic of ATFM and its connection with ATS	

Air Traffic Flow Management Steering Group

Task List

(last updated ATFM/SG/12, 16 September 2022)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
5/10	Develop First Draft Operational Requirements Document	~~ATFM/SG/12~~ ATFM/SG/13	ATFM/IR/SWG	Open	Dependent on meeting schedule cycle Updated ATFM/SG/8 Reviewed ATFM/SG/11 The need for the task to be reviewed after the Framework 2022 update. ATFM/IR/SWG reports to ATFM/SG/13
5/13	Research ATFM for long range flights	Ongoing ATFM/SG/13 ATM/SG/10 (CANSO)	Australia/ India/ Japan/ New Zealand/ Pakistan/ Singapore/ Thailand/ CANSO/ IATA	Open	Updated ATFM/SG/8 Updated ATFM/SG/11 Action Item 11/8 also refers. CANSO provides a paper at ATM/SG/10
7/1	Investigate and Develop a draft PfA for Doc 7030 Regional Supplementary Procedures for Cross-border ATFM	~~ATFM/SG/12~~ ATFM/SG/13	China/Japan/Singapore/Thailand/Secretariat	Open	Final Decision on this yet to be made. Update ref ATFM/SG/9 report ADEXP and EET in FPL First draft provided Action Item updated at ATFM/SG/10

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
~~**8/3**~~	Investigate and report on reasons for high rates of non-compliance with received CTOT at Jakarta. Report to ATM/SG/7 and Multi-Nodal/18	~~Multi-Nodal/18~~ ATFM/SG/12	Indonesia Chair/Secretariat	~~Open~~ Closed	Refer also ATFM/SG/9 IP/13
9/5	Missing DEP messages follow-up multi-State analysis	~~24 July 2020~~ ~~ATM/SG/9~~ 30 September 2022 (POC) October (data gathering) APANPIRG/33 (by 31 Oct)	Australia, China, India, Japan, Mongolia, Singapore, Thailand,	Open	To be coordinated/confirmed, depending on level of traffic recovery post-COVID-19 pandemic POC confirmation ATFM/SG/12 report para. 4.39 and 4.43
9/9	Analysis of MET requirements to support Non-ASBU elements of Seamless ~~ATM~~ ANS Plan	~~ATFM/SG/12~~ ATFM/SG/13	Secretariat/MET R WG Chair	Open	Updated ATFM/SG/11 To be discussed by ~~MET/R WG/9~~ MET/R WG/11 – to consider in context of 2022 update of Seamless ANS Plan
~~**10/4**~~	Communication strategy and enhanced work plan for ATFM/IR/SWG	~~15 May 2020~~ ATFM/SG/12	Chair/Secretariat	~~Open~~ Closed	Action Item 5/10 also refers

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
~~10/5~~	Develop agenda and offline work schedule ~~ATFM/SG/11~~ for review of Regional Framework for Collaborative ATFM	~~15 May 2020~~ 30 September 2021	Chair/Secretariat	~~Open~~ Completed	Agenda focused on Review of Regional ATFM Framework Work schedule to include frequent VTC progress meetings. Updated ATFM/SG/11. Partly completed. Scope of work agreed. Action item 11/8 refers. Schedule and rapporteur to be finalized.
~~10/6~~	Nominate experts to work on offline tasks for Review of Regional ATFM Framework	~~15 May 2020~~ 30 September 2021	States/IOs	~~Open~~ Completed	Email to Secretariat ssumner@icao.int Updated ATFM/SG/11 ATFM/IR/SWG to manage.
~~10/7~~	Respond to survey on MET services for ATM, to be distributed by State Letter	~~TBC State Letter~~ ATFM/SG/12	All Administrations	~~Open~~ Completed	Updated ATFM/SG/11. State Letter (to be distributed) will include reply-by date.
11/1	*APA-CDM/TF Action Item 5/2 - included in ATFM/SG Task List pending APANPIRG decision on re-assignment of responsibility for A-CDM.* Develop joint operational procedure guidance for the integration of ATFM and A-CDM operations, focusing the integration between A-CDM and "cross-border" ATFM in collaboration with Experts from ATFM/SG and SWIM TF	~~ATFM/SG/12~~ ATFM/SG/13 ATM/SG/10 (CANSO)	(APA-CDM/TF/6) Hong Kong China to lead China, India, Pakistan, Republic of Korea, Thailand, Group of Experts, CANSO	In progress	Included at ATFM/SG/11 APA-CDM/TF/6 WP/03 Task to be carried out by the APANPIRG technical body assigned ongoing responsibility for oversight of A-CDM. CANSO provides a paper ATM/SG/10

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
11/2	*APA-CDM/TF Action Item 5/3 - Included in ATFM/SG Task List pending APANPIRG decision on re-assignment of responsibility for A-CDM.* Identify any other data attributes which are necessary to support the A-CDM and ATFM integrated operations (from A-CDM perspective), in addition to the ones already included in the current version of the FIXM ~~v4.1~~ v4.2 Extension in collaboration with Experts from ATFM/SG and SWIM TF.	~~ATFM/SG/12~~ 31 December 2022 (Operational requirement)	(APA-CDM/TF/6) Thailand to lead Hong Kong China, India, Pakistan, Group of Experts, CANSO	~~To be commenced~~ Open	Included at ATFM/SG/11 Task to be carried out by the APANPIRG technical body assigned ongoing responsibility for oversight of A-CDM. Dependent on progress of action item 11/1 Refer also SWIM/TF progress on FIXM 4.2 Extension offline with SWIM/TF ATFM/SG/12 report para. 5.15
11/3	Follow up technical enquiry on whether BOBCAT can send SAM to ATC at departure aerodromes outside Thailand that are not transiting the Bangkok FIR.	ATFM/SG/12 ATFM/SG/13	Thailand	Open	ATFM/SG/11 Report para 4.7 May require support/guidance from AMNAC Technical Sub-Group and/or ATFM/IR/SWG.
~~**11/4**~~	Contribute knowledge and experience on integration of ATFM and AMAN/XMAN, Long Range ATFM and TBFM to CANSO white paper.	30 September 2021	Australia/China/India/Japan/New Zealand/Pakistan/Singapore/Thailand/USA/CANSO/IATA	~~Open~~ Closed	ATFM/SG/11 Report para 4.56 and 4.69 All administrations welcome to input. Not restricted to CANSO members only.

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
~~**11/5**~~	Provide specific data on flights for which DEP messages for flights entering the Bangkok FIR were not received, in order that action could be taken to rectify the problem.	31 August 2021	Thailand	~~Open~~ Completed	ATFM/SG/11 Report para 4.80
~~**11/6**~~	Examine proposal to rename *marginal* implementation status to better reflect the level of progress for internal ANSP reporting.	05 November 2021	Secretariat	~~Open~~ Closed	ATFM/SG/11 Report para 4.89 further discussion at ATM/SG/10
~~**11/7**~~	Review Draft *APAC User Requirements for SWIM-based MET Information Services Supporting ATFM* and provide additional use cases to MET R/WG Ad hoc Group.	30 September 2021	All Administrations	~~Open~~ Closed	ATFM/SG/11 Report para 5.2
~~**11/8**~~	Review Regional Framework for Collaborative ATFM.	ATFM/SG/12	ATFM/IR/SWG and CANSO Nomination of SWG members to be made by 15 September 2021 (action item 10/6)	~~Open~~ Completed	(Consolidation of action items 9/1, 9/2, 10/1). Scope of work provided in **ATFM/SG/11 Report of the Meeting – Appendix E**
~~**12/1**~~	India was requested to provide a draft of a contingency ATFM response concept	ATFM/SG/13	India, Thailand, Secretariat	~~Open~~ Closed	Transferred from ATM/SG Task List 05/11/2021 (Formerly ATM/SG Action Item 7/4) ATMOPS Panel ATFM group
12/2	Amend provisional Agenda to include specific item for A-CDM matters	30 September 2022	Chair, Secretariat	Open	ATFM/SG/12 report para. 1.2
12/3	Register the Asia/Pacific Bi-Weekly Web Conference (AMNAC) to share the ATFM-related information	Ongoing	Administrations willing to join	Open	ATFM/SG/12 report para. 4.29 invitation extended to some States outside of AMNAC
12/4	CTO compliance window follow-up (lessons learned from other Regions)	ATFM/SG/13	Secretariat	Open	ATFM/SG/12 report para. 4.73

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
12/5	Provide Regional ATFM Monitoring and Reporting Form for 2022	30 September 2022	Administrations not yet submitted	Open	ATFM/SG/12 report para. 4.49
12/6	Explore what seasonal meteorological conditions information (airport and airspace) are required during ATFM strategic phase in coordination with AUs	MET/R WG/12 (22-26 May 2023)	ATFM/IR/SWG	Open	ATFM/SG/12 report para. 5.3
12/7	Provide A-CDM Points of Contact	30 September 2022	Administrations and IOs	Open	ATFM/SG/12 report para. 6.1
12/8	Consider a guidelines for each element of the Regional ATFM Plan and Monitoring and Reporting Form	30 September 2022	ATFM/IR/SWG	Open	ATFM/SG/12 report para. 5.14
12/9	Consider to include of the remarks column in the Regional ATFM Plan and Monitoring and Reporting Form	30 September 2022	ATFM/IR/SWG	Open	ATFM/SG/12 report para. 5.14
12/10	Provide a FAQ to assist States in reviewing their ATFM implementation	ATFM/SG/13	New Zealand, Hong Kong China, Thailand and Singapore	Open	ATFM/SG/12 report para. 4.16